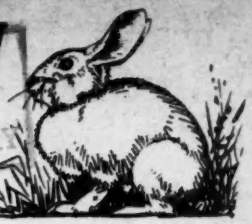
WILDLIFE REVIEW



AN ABSTRACTING SERVICE FOR WILDLIFE MANAGEMENT
ISSUED FOR THE INFORMATION OF COOPERATORS
BY THE FISH AND WILDLIFE SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

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Chicago, Ill. No. 39 February, 1944

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Bibliography: Woodcraft

Kelker, George Hills. A course in "winter woodcraft", Journ. Wildlife Management (P. F. English, 206 Forestry Bldg., State College, Pa. $1.00 a copy), 8(1), Jan. 1944, pp. 81-83.

About 50 titles of works on the outdoors and on caring for one's self there.

Classification: Bat, Free-tailed

Stager, Kenneth E. A new free-tailed bat from Texas, Bul. Southern Calif. Acad. Sci. (Los Angeles County Museum, Exposition Park, Los Angeles, Calif.), 41(1), Jan.-April 1942, pp. 49-50.

Tadarida texana n. sp.; description, measurements; Medina County, Texas.

Classification: Grouse, Sharp-tailed

Friedmann, Herbert. A new race of the sharp-tailed grouse, Journ. Washington Acad Sci. (H. S. Rappleye, U. S. Coast & Geodetic Survey, Washington, D. C. 50 cents a copy), 33(6), June 1943, pp. 189-191.

Description of a new form (Pedioecetes phasianellus caurus) from Alaska with comparative notes and key to 6 subspecies.

Classification: Porcupines

Anderson, R. M., and A. L. Rand. Variation in the porcupine (Genus Erithizon) in Canada, Canadian Journ. Research (National Research Council, Ottawa, Canada), 21(9), D, Sept. 1943, pp. 292-309, 1 pl., 1 map, 6 tables.

The authors consider that the porcupines of Canada previously referred to two species belong to one, of which five subspecies are recognized. The characters are evaluated and their variations discussed. For each subspecies are presented: synonymy, measurements, diagnosis, statement of range, remarks, and a list of specimens examined. Bibliography of 17 titles.

Classification: Shrew

von Bloeker, Jack C. A new shrew from Santa Catalina Island, California, Bul. Southern Calif. Acad Sci. (Los Angeles County Museum, Exposition Park, Los Angeles, Calif.), 40(3), Sept.-Dec. 1941, pp. 163-164.

Sorex willetti n. sp.; original description, comparative notes.

Conservation

Grange, Wallace B. How to increase the passenger pigeon, Passenger Pigeon (N. R. Barger, State Office Bldg., Madison, Wis.), 5(3), Oct. 1943, pp. 77-79.

The title is ironical. The message of this paper, and it is one not uncalled for, is that "the time to devise management measures is while a species is still abundant" (Edge Committee) and that keeping natural propagation in full functioning is essential. The last passenger pigeon died in a zoological garden. "We have progressed far since then." The last species of American bird to depart his earthly scene was the Heath Hen. The last bird did not die in a zoo. The death agony was actually described, almost convulsion by convulsion, out-of-doors in the Massachusetts oak scrub, in 1929. If this is not progress, what shall we call it? And the next species on the list? If it must perish, let us resolve that it will do so on an area where the white man has applied every known scientific aid in the preservation of the native environment which alone will insure its continued natural propagation: But where he first has foregone the dubious pleasure of clubbing soft creatures from their nestlings; of stool pigeoning the trusting thousands to the nets; of grasping today for the three cent material reward for a stilled body which, had it been left to propagate in our tomorrows, might have recreated a food of the spirit for those of us who are now lonely and saddened in our woodlands. Let us, however, resolve that no longer shall extermination days come to America to be marked wistfully in our natural histories; let us resolve that long before any species shall again arrive at this day of judgment we shall so well understand the problems and remedies involved that no present American species of bird or animal shall henceforth 'perish from the earth.'"

An earlier article in this same issue of The Passenger Pigeon repeats the old assertion that the reason for the disappearance of Ectopistes is "yet unknown to science." This surely is a misapprehension. The entire population of the species, at least in its latter days, nested together. On the latest great nesting grounds, it was slaughtered beyond conception, the carcasses shipped in car-loads. So long as profitable numbers of the birds could be obtained, they were netted to serve as targets in trap-shooting. Scattered survivors were shot everywhere that they appeared. Man did everything possible to destroy this species and succeeded, then had the effrontery to invoke a natural calamity as the reason.

Conservation: Alaska wildlife

Gabrielson, Ira N. Alaskan wildlife, Audubon Magazine (1006 Fifth Ave., New York, N. Y. 35 cents a copy), 40(6), Nov.-Dec. 1943, pp. 329-335, 5 photos.

Abundance of wildlife in Alaska is local and is not a fair index to animal status in the territory as a whole. The short growing season for plants puts a limit on food production and that in turn upon wildlife. Sportsmen for years, and now the military occupants, stimulated perhaps by the prevailing non-resident view, have in some instances committed wanton destruction, not, however, to the extent rumored. In general, authorities are giving good support to conservation efforts. To improve the situation, refuges can be established in the most favorable areas, the dependence of native populations upon wildlife for food can be lessened by commercial developments, and legal protection can be made more effective.

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Conservation: Concepts

Presnall, Clifford C. Wildlife conservation as affected by American Indian and Caucasian concepts, Journ. Mammalogy (Emmet T. Hooper, University of Michigan, Ann Arbor. $1.00 a copy), 24(4), Nov. 1943; pp. 458-464.

Discussion of accounts, mostly erroneous, of the Indians' relations to wildlife and citation of 20 titles of the most pertinent literature. "Stated briefly, the Indian thinks of wildlife as a utility; the Caucasian regards it primarily as a source of pleasure." "The Indian's viewpoint was the correct one in his economy, and there are strong indications that our own viewpoint of wildlife as primarily a luxury must be modified toward a utilitarian view if wildlife conservation is to achieve maximum usefulness in the future economy of the United States."

Conservation: Grouse, Spruce

Scott, Walter E. The Canada spruce grouse in Wisconsin, Passenger Pigeon (N. R. Barger, State Office Bldg., Madison, Wis.), 5(3), Oct. 1943, pp. 61-72, 3 photos, 1 map, 2 tables.

Review of information on cover preferences and food habits, statement of the probable original range and population in Wisconsin, decimation and recent recorded range, and present distribution and numbers. The story is one of rapid loss of range due to a number of reasons, for all of which, however, man is responsible. Probably the largest single factor was his killing of these tame birds, but lumbering, fires, and settlement also were important. The range is down 75 percent or more and the total number of birds in the State is under a thousand. Management suggestions are made but what is most needed is protection.

Conservation: Pan-American

Lincoln, Frederick C. Wildlife management in the Americas, Agriculture in the Americas (Supt. of Documents, Washington, D. C. 10 cents a copy), 4(1), Jan. 1944, pp. 13-17, 2 photos.

Value of wildlife to the pioneers; overexploitation; harmful effects of drainage; Federal legislative and refuge program of the United States; treaties with Great Britain (for Canada) and Mexico; convention for the preservation of the flora and fauna in the Western Hemisphere; restoration of waterfowl in North America; protection of the chinchilla, vicuna, and guano birds in South America; cooperative wildlife research and Federal aid to wildlife restoration programs in the United States; economic value of wildlife for food and other purposes; these values can be preserved only by good management. Adapted from an address delivered at the Second Inter-American Conference of Agriculture at Mexico City, 1942.

Conservation: Wildlife

Taylor, Walter P. Some animals of the American wilderness, The Living Wilderness (The Wilderness Society, 1840 Mintwood Place, Washington, D. C.), 8(9), Oct. 1943, pp. 21-31, 14 photos.

Reasons for decline of wildlife from its primitive abundance, with illustrative instances. Man's unfavorable effects upon wildlife habitat are succinctly reviewed. For restoration of depleted species, suitable environment should be preserved or developed. Methods are known but to put them into full effect demands education, suppression of political influences upon conservation departments, strong authorization and support of these organizations, management, inventory, and regulated harvest.

Conservation: Wildlife

Van Dersal, Wm. R. The American land, its history and uses, Oxford University Press (114 Fifth Ave., New York, N. Y. $3.75 a copy), xvi+215 pp., frontis. + 60 pls., 1943.

Part of a chapter, "Land for wildlife" (pp. 173-177, pls., 53-54), reviews the destructive and constructive effects of man upon wildlife, and stresses conservation as a land utilization program in which refuges and wildlife coverts on agricultural lands play leading parts.

Control: Coyote

Anon. Cyanide gun used to control coyotes in other states, North Dakota Outdoors (State Game & Fish Dept., Bismarck, N. Dak.), 6(6), Dec. 1943, pp. 4-6, illus.

Illustrations, description, and directions for use of the Humane Coyote Getter, the use of which, however, is not yet legal in North Dakota.

Control: Hare, Snowshoe

Mather, Deane M., Robert H. Gensch, and H. Allen Barton. Report on the snowshoe hare repellent and poison studies conducted on the Nicolet National Forest in 1941 and 1942, U. S. Forest Service, Region 9 (Milwaukee, Wis.), 36 pp., 3 pls., 25 tables, processed, 1943.

Report on tests of the protective value of a variety of repellents in fenced areas. Some were effective but further experimentation is considered desirable. Trial of poisons was limited but the results are given for what they are worth. Public sentiment is against lethal methods of control. Incidental notes on food habits and life history are included, and recommendations as to future studies are made.

Control: Mesquite

Parker, Kenneth W. Control of mesquite on southwestern ranges, U. S. Dept. of Agriculture Leaflet 234 (Supt. of Documents, Washington, D. C.), 8 pp., 4 figs., Oct. 1943.

While mesquite has value as a livestock and wildlife food, in erosion control, and for wood for posts and fuel, it tends to spread and monopolize areas that can more profitably be kept in grass. "The hard-coated seeds after being eaten by cattle, game, rodents, or birds, are dispersed and germinate readily." Suggestions are made as to control by hand grubbing, machine clearing, and poisoning by oils and sodium arsenite.

Control: Mouse, Field

Woodside, A. M., R. K. Jefferson, R. C. Moore, and E. H. Glass. Control of field mice in apple orchards, Virginia Agr. Expt. Sta. (Blacksburg), Bul. 344, 15 pp., 6 figs., 3 tables, 1942.

Field mice (including Pitymys p. pinetorum and Microtus pennsylvanicus) are a serious menace to apple orchards in Virginia. Few growers in the State have escaped loss of valuable trees. The animals and their work are briefly described and suggestions are given as to control by the use of poisoned baits, poisonous gases, and traps. The pasturing of livestock in orchards has some value in discouraging and driving out mice; when hogs are involved, elimination of the mice may be almost complete. Hogs, ranging an orchards in summer, aid in controlling codling moths also.

Control: Rat

Ponges, Ralph. The use of curtain walls in rat proofing, U. S. Public Health Reports (Supt. of Documents, Washington, D. C. 5 cents a copy), 58(52), Dec. 24, 1943, pp. 1881-1885, 1 table.

"Curtain walls may be defined as exterior walls that serve to enclose rather than support." This article discusses experiments that have been made to determine an effective type of screening wall. For routine rat-stoppage, it is suggested that a 24-inch, L-shaped wall be used. Specifications are given. Bibliography of 10 titles.

Control: Rat

Sherrard, G. C. The benefits accruing from the ratproof construction of vessels, U. S. Public Health Reports (Supt. of Documents, Washington, D. C. 5 cents a copy), 58(52), Dec. 24, 1943, pp. 1888-1890.

"The benefits which shipping interests derive from operating ratproof ships may be summed up as follows: (1) Reduction of the expense and delay resulting from fumigation necessitated by rat infestation; (2) protection of the vessel's passengers and crew against the hazards of rat-borne diseases; (3) elimination of damage to cargo and ship structure from gnawing of rats;

(4) reduction of fire hazards. All of these benefits are not subject to appraisal. However, the frequency of fumigations, together with the degree and frequency of rat infestation on shipboard, is a matter of record." "A comparison is made between ratproofed and non-ratproofed vessels as to rat infestation and fumigation. Only 1.7 percent of the 763 ratproofed ships entering the port of New York during the fiscal year 1943 was rat infested and in no instance was the infestation sufficient to require fumigation."

Control: Trap efficiency

Casto, William, and Clifford C. Presnall. Comparison of coyote trapping methods, Journ. Wildlife Management (P. F. English, 206 Forestry Bldg., State College, Pa. $1.00 a copy), 8(1), Jan. 1944, pp. 65-70, 1 table.

Authors' summary: "A field test of trapping methods was made on the San Carlos Indian Reservation, Arizona, in the spring of 1941, to compare the relative merits of chain-noose traps and steel-jaw traps for coyotes. The chain-noose traps were decidedly less efficient and less practical than the steel-jaw traps, and apparently somewhat less humane. Steel-jaw traps and chain-noose traps were set under closely similar conditions, resulting in 9 coyotes caught and held by the former during 87 trap nights; and 2 coyotes caught but none held by the latter during the same number of trap nights. The relative inefficiency of the chain-noose traps was found to be due chiefly to the arrangement of the tripping mechanism and the spring. Although a comparison of humane qualities was difficult, owing to the small number of trapped animals in this test, the sawing action of the chain-noose trap produced more severe injuries than any by the steel-jaw trap."

Cycles: Hare, Snowshoe

Chitty, Dennis, and Mary Nicholson. The snowshoe rabbit enquiry, 1940-41, Canadian Field-Naturalist (I. L. Conners, Central Experimental Farm, Ottawa, Canada. 25 cents a copy), 57(4-5), April-May 1943, pp. 64-68, 2 figs., 2 tables.

Authors' summary: "During 1940-41 the snowshoe rabbit, Lepus americanus, continued to increase throughout most of its range, the distribution of observers' reports between increase, decrease and no change being about the same as in 1939-40. In Alaska and the Yukon the early stages of recovery had not obviously become established; while, at the opposite phase of the cycle, rabbits had reached high numbers in parts of the north of the four western provinces and in Nova Scotia. The beginnings of epidemics were noticed locally. The populations in southern British Columbia remained stable, reports from this area accounting for the high proportion of no change in the province. In Minnesota a great improvement was obvious; but east of here, both in Canada and the U. S. A., the speed of recovery was definitely slow."

Cycles: Lemming

Shelford, V. E. The abundance of the collared lemming (Dicrostonyx groenlandicus (Tr.) var. richardsoni Mer.) in the Churchill area, 1929 to 1940, Ecology (Prince & Lemon Sts., Lancaster, Pa. $1.50 a copy), 24(4), Oct. 1943, pp. 472-484, 3 figs.

Report on a period of 13 years in six of which field work by the author or an assistant (Arthur C. Twomey) was carried on at this Hudson Bay locality. Following wet autumns the lemmings were limited to the sandy ridges but in drier years they were more generally distributed. Heavy snowfall and mild winters as well as temperatures above normal in July and August favor population increase. "Two favorable (or the first may be merely not unfavorable) years in succession are usually necessary to build up a peak population." "Very cold winters with little snow are accompanied by sharp declines of both mice and lemmings." Apparently predatory birds and mammals are an important part of the mechanism of destruction. The paper includes information on breeding, burrows, and enemies of the lemmings, and discusses the limiting effects of disease, predation, surface water and ice, and the weather in general, as well as the magnitude of the population changes. Peaks come at intervals of 3 and 4 years.

Depredations: Deer damage to trees

Lutz, H. J., and H. H. Chapman. Injuries to young tree trunks from antler rubbing by deer, Journ. Wildlife Management (P. F. English, 206 Forestry Bldg., State College, Pa. $1.00 a copy), 8(1), Jan. 1944, pp. 80-81, 1 pl.

Summary of observations in Connecticut. Damaged trees were seen on about 13 percent of 500 quarter-acre plots. No distinct preferences among species of trees was observed. Stem diameters ranged from 0.5 to 4.7 inches and the age of the trees averaged about 22 years. The bark is destroyed and in healing the trunks inclose serious defects. Most of the trees attacked "can never be expected to produce anything but fuelwood or other products of low value."

Destruction: Pigeon, Passenger

Fenton, Wm. N., and Merle H. Deardorff. The last passenger pigeon hunts of the complanter Senecas, Journ. Washington Acad. Sci. (H. S. Rappleye, U. S. Coast & Geodetic Survey, Washington, D. C. 50 cents a copy), 33(10), Oct. 1943, pp. 289-315, 1 map.

Review of early references to Indian hunting of the pigeons. Cornplanter (Seneca) practices in this respect; pigeon hunting in mythology; relation of Indian, with white, pigeoners; disappearance of the pigeons; their value as food to the Seneca Indians; prehistoric evidence; comparative notes. Bibliography of 36 titles.

Diseases and Parasites: Aspergillosis

Herman, Carlton M. An outbreak of mycotic pneumonia in mallards, California Fish and Game (Ferry Bldg., San Francisco, Calif.), 29(4), Oct. 1943, p. 204.

About 300-350 mallards died during a brief epidemic in Modoc County.

Diseases and Parasites: Aspergillosis

Zeliff, C. Courson. A fungus infection of the lungs and air sacs of a common mallard, Bird-Banding (Charles B. Floyd, 210 South St., Boston, Mass. 75 cents a copy), 14(4), pp. 127-130, 1 pl.

Massachusetts; description and illustration of lesions; general remarks on this disease in birds. Bibliography of 8 titles.

Diseases and Parasites: Botulism

Bach, Roy M. Botulism, North Dakota Outdoors (State Game & Fish Dept., Bismarck, N. Dak.), 6(6), Dec. 1943, pp. 6-7.

Popular general account of this malady of waterfowl. Conditions suitable for growth of the bacteria are itemized. As many as 5,000 ounces of lethally poisoned water may be gathered from around a single infected duck carcass. To destroy the spores, 30 minutes, and the toxin, 20 minutes, of boiling are required. As a precaution, all home-canned products should be boiled for the shorter period.

Diseases and Parasites: Chagas' disease

Wood, Sherwin F. Observations on vectors of Chagas' disease in the United States. I. California. Bul. Southern Calif. Acad. Sci. (Los Angeles County Museum, Exposition Park, Los Angeles, Calif.), 41(2), May-Aug. 1942, pp. 61-69, 2 tables.

Includes synopsis of original and collected information on California mammals as hosts of trypanosomes. Bibliography of 21 titles.

Diseases and Parasites: Chagas' disease

Wood, Sherwin F. Observations on vectors of Chagas' disease in the United States. II. Arizona. Amer. Journ. Tropical Med. (Williams & Wilkins Co., Baltimore 2, Md.), 23(3), May 1943, pp. 315-320.

An adult female wood rat (Neotoma a. albigula) withstood more than a thousand feedings of the cone-nosed bugs (Triatoma) that transmit the disease. Names are given of a few Arizona mammals in which the malady was not identified. Bibliography of 8 titles, five or more of which have to do with mammals.

Diseases and Parasites: Coccidiosis

Herman, Carlton M., and John E. Chattin. Epidemiological studies in coccidiosis of California quail. I. Occurrence of Eimeria in wild quail, California Fish and Game (Ferry Bldg., San Francisco, Calif.), 29(4), Oct. 1943, pp. 168-179, Figs., 57-60, 2 tables.

General account of coccidiosis and review of publications upon the disease in California quail. The methods and findings of the study are discussed. Authors' summary: "A total of 3,500 quail fecal samples have been examined for the presence of coccidia, Eimeria spp, were found to be present in 19 different areas and 5 game farms. The lowest incidence of infection where more than 49 samples were collected was 19.6 per cent; many areas showed over 50 per cent of the birds to be infected, and several were over 90 per cent. The intensity of infection varied in different areas as well as in the same area at different times of the year. At Dune Lakes, where periodic samples about a month apart were taken, the highest intensity of infection was at the end of August with another high point in January. Examination of soil samples from three areas seem to indicate that soil contamination is not an important factor in the maintenance of coccidiosis in wild quail." Bibliography of 10 titles.

Diseases and Parasites: Lead poisoning

Adler, Frederick E. W. Chemical analyses of organs from lead-poisoned Canada geese, Journ. Wildlife Management (P. F. English, 206 Forestry Bldg., State College, Pa. $1.00 a copy), 8(1), Jan. 1944, pp. 83-85, 1 table.

Lesions of lead poisoning are described and the results of analyses of different parts of the body of affected birds tabulated and discussed. "It would appear that the best organ to choose for chemical analysis in aiding diagnosis would be the liver." The specimens studied were from Portage Lake, Wisconsin.

Diseases and Parasites: Pasteurellosis

Hinshaw, W. R., and J. T. Emlen. Pasteurellosis in California valley quail, Cornell Veterinarian (P. P. Levine, Cornell University, Ithaca, N. Y. 75 cents a copy), 33(4), Oct. 1943, pp. 351-354.

Report on an outbreak of the disease among wild-trapped quail after being in captivity a little more than a month. No symptoms were noted previous to death. Lesions and bacteriological findings are described. The causative organism was determined only to the genus.

Diseases and Parasites: Plague

Anon. Plague infection in California, U. S. Public Health Reports (Supt. of Documents, Washington, D. C. 5 cents a copy), 58(41), Oct. 8, 1943, pp. 1528-1529.

Records of identification in 3 species of rodents in four counties.

Diseases and Parasites: Relapsing fever

De Shazo, Thelma E. Triatoma heidemanni as a possible vector of relapsing fever, Amer. Journ. of Medical Technology (4310 West Fort St., Detroit, Mich. 50 cents a copy), 9(3), May 1943, pp. 75-81.

Notes given on wild mammals known to have natural infections of the fever. As a result of her experiments, the author says, "It may be assumed that Triatoma heidemanni [a predaceous bug] does not transmit the relapsing fever." Bibliography of 17 titles.

Diseases and Parasites: Strongylosis

Bach, Roy N. Strongylosis, North Dakota Outdoors (State Game and Fish Dept., Bismarck, N. Dak. 5 cents a copy), 6(4), Oct. 1943, pp. 13-14.

Description of Trichostrongylus tenuis and the lesions and symptoms it causes in the Hungarian partridge. Request for cooperation in study of the disease. Bibliography of 6 titles.

Diseases and Parasites: Tularemia

Green, R. G. Virulence of tularemia as related to animal and arthropod hosts, Amer. Journ. Hygiene (615 North Wolfe St., Baltimore, Md. $2.00 a copy), 38(3), Nov. 1943, pp. 282-292, 11 tables.

Author's conclusions: "In our experimental transmissions of tularemia directly from wild-life forms, tularemia transferred from naturally infected grouse to guinea pigs produced prolonged infections averaging 15 days before death. Guinea pigs injected from infected rabbits died after an average duration of 6 days. A similar difference was evident in the disease produced by injection of ticks from grouse and from rabbits. As the grouse strains of tularemia were passed through guinea pigs, the length of the infection decreased until it was identical with that of rabbit-strain infections. It therefore appears that Pasteurella tularensis naturally infecting grouse has lowered virulence for guinea pigs and that this virulence is increased by serial passage. It is suggested that the distinctive group of laboratory infections of human beings with tularemia may be due to modifications of the disease by passage of the organism through guinea pigs incident to laboratory work. The virulence of tularemia strains isolated from ticks found on rabbits and grouse appears to be determined by the animal or bird host from which the arthropods obtained their infection."

Diseases and Parasites: Tularemia

Yeatter, Ralph E., and David H. Thompson. Cottontails, tularemia and weather, Illinois Conservation (Illinois Dept. of Conservation, State House, Springfield), 8(4), Winter 1943, pp. 6-7, 30, tables, cartoons.

Record of human cases of tularemia, including number of deaths, in Illinois 1926-1943, and distribution of them by months. The authors confirm a

finding previously reported from Minnesota and Ohio that the tick vectors become inactive with the advent of freezing weather. Those handling rabbits after that period are far less likely to contract tularemia. Precautions against infection are discussed but delaying the opening of the season is recommended.

Acarina,
Diseases and Parasites: Haemaphysalis

Green, R. G., C. A. Evans, and C. L. Larson. A ten-year population study of the rabbit tick Haemaphysalis leporis-palustris, Amer. Journ. Hygiene (615 North Wolfe St., Baltimore, Md. $2.00 a copy), 38(3), Nov. 1943, pp. 260-281, 3 figs., 7 tables.

Authors' summary: "(1) On the Lake Alexander Area the hosts found to be important in the biology of the rabbit tick were cottontail rabbits, ruffed grouse, and snowshoe hares. Snowshoe hares carry an average of 4 times as many ticks as do cottontails and about twice as many ticks as do ruffed grouse. As a result of the differences in populations of these 3 species, the number of ticks that feed on cottontail rabbits and ruffed grouse is insignificant except in those years when snowshoe hares are at the low point in their population cycle. Then the number of ticks feeding on grouse may constitute as many as one-third of all feeding ticks on the area; (2) ticks emerge from hibernation in the first half of April and are present on 100 per cent of snowshoe hares until October. During May, June, and July there is usually an average of from 500 to 2,500 ticks to the hare. A rapid rise in number of ticks, due to the emergence of larvae, occurs in August, and a high level of infestation is maintained through September and into October. Most hares are free of ticks after the first of November, but occasionally a hare has been found to carry ticks in December, January, and even February; (3) the level of the tick infestation during May and June depends upon the number of ticks present during the latter half of the preceding summer. The degree of infestation during August and September is determined by the population of snowshoe hares during the preceding spring; (4) an estimate of the number of feeding ticks to the square mile has been obtained by multiplying the number of hares to the square mile by the average number of ticks to the hare. From these data it has been shown that the changes in population of hares during the 10-year cycle are reflected and greatly magnified by resultant changes in the population of ticks. In September, 1933, when the snowshoe-hare population was at the peak of its cycle, there were an estimated 2,800,000 feeding ticks to the square mile. Five years later, in September 1938, when the hare population was at the low point of the cycle, there were about 150,000 feeding ticks to the square mile; (5) by comparing the number of feeding ticks in May with the number in the preceding September, an estimate of the proportion of ticks that survive through the winter was obtained. The gross winter mortality was due largely to the death of larval ticks; (6) weather did not appear to influence markedly either the rate of reproduction of ticks during the summer or the mortality during the winter." Bibliography of 10 titles.

Diseases and Parasites: Cestoda, Fimbriariinae

Webster, J. Dan. A revision of the Fimbriariinae (Cestoda, Hymenolepididae), Trans. Amer. Microscopical Soc. (James E. Ackert, Kansas State College, Manhattan), 62(4), Oct. 1943, pp. 390-397, 2 pls.

A group of parasites of shore and water birds; the author describes and illustrates the species and names two as new: Fimbrariciodes lintoni from sea ducks, Massachusetts, and F. haematopodis from the black oyster-catcher, Alaska. He presents also a synopsis of the subfamily and a discussion of its taxonomy. Bibliography of 7 titles.

Diseases and Parasites: Cestoda, Hymenolepis

Shepard, Wayne. A new hymenolepidid cestode, Hymenolepis parvisaccata, from a pintail duck, Trans. Amer. Microscopical Soc. (James E. Ackert, Kansas State College, Manhattan), 62(2), April 1943, pp. 174-178, 1 pl.

Oklahoma. Original description, measurements, illustrations, comparative notes. Bibliography of 9 titles.

Diseases and Parasites: Cestoda, Protogynella

Jones, Arthur W. Protogynella blarinae n.g., n. sp., a new cestode from the shrew, Blarina brevicauda Say, Trans. Amer. Microscopical Soc. (James E. Ackert, Kansas State College, Manhattan), 62(2), April 1943, pp. 169-173, 1 pl.

Virginia. Original description, measurements, and illustrations. Discussion of generic relationships and protogyny of this cestode, probably the smallest yet described (less than one millimeter). Bibliography of 11 titles.

Diseases and Parasites: Cestoda, Raillietina

Rigney, Carl C. A new Davaineid tapeworm Raillietina (Paroniella) centuri, from the red-bellied woodpecker, Trans. Amer. Microscopical Soc. (James E. Ackert, Kansas State College, Manhattan), 62(4), Oct. 1943, pp. 398-403, 1 pl.

Oklahoma; description, measurements, illustrations; notes on 10 species of the subgenus from piciform hosts. Bibliography of 10 titles.

Diseases and Parasites: Diptera, Cuterebra

Dalmat, Herbert T. A contribution to the knowledge of the rodent warble flies, Journ. Parasitology (Science Press, Lancaster, Pa. $1.50 a copy), 29(5), Oct. 1943, pp. 311-318, 2 figs.

Discussion of infestation of domestic animals and report on a study of Cuterebra in white-footed mice in Iowa. In 1940, 38 percent and in 1941, 54

percent of the mice trapped were parasitized. From 3 to 5 larvae were commonly found on a single mouse and in one instance 7 were present. Discussion of the method of infection, and account of the life history of the fly C. peromysci. In captivity, 20 percent of the infested mice died. Bibliography of 11 titles.

Diseases and Parasites: Diptera, Cuterebra

Test, Frederick H., and Avery R. Test. Incidence of dipteran parasitosis in populations of small mammals, Journ. Mammalogy (Emmet T. Hooper, University of Michigan, Ann Arbor. $1.00 a copy), 24(4), Nov. 1943, pp. 506-507.

Report on parasitization of Peromyscus leucopus by Cuterebra angustifrons in Parke County, Indiana, with an incidence of 28.7 percent. Review of several other recorded infestations in the United States.

Diseases and Parasites: Diptera, Trichobius

Augustson, G. F. A new parasitic fly from bats (Diptera: Pupipara), Bul. Southern Calif. Acad. Sci. (Los Angeles County Museum, Exposition Park, Los Angeles, Calif.), 42(1), Jan.-April, 1943, pp. 52-53, 1 pl.

Trichobius adamsi n. sp., from Macrotus californicus, Arizona; description, illustration.

Diseases and Parasites: Nematoda, Physaloptera

Morgan, Banner B. The physaloptera (Nematoda) of reptiles, Naturaliste Canadien (J. W. Laverdiere, Boulevard de l'Entente, Quebec, Canada), 70(7-8), July-Aug. 1943, pp. 179-185, 1 pl.

Only three species known; the paper gives their history, a key and figures for their identification, synonymy, and a host list. Bibliography of 25 titles.

Diseases and Parasites: Nematoda, Protostrongylus

Goble, Frans C., and Ellsworth C. Dougherty. Notes on the lungworms (Genus Protostrongylus) of varying hares (Lepus americanus) in eastern North America, Journ. Parasitology (Science Press, Lancaster, Pa. $1.50 a copy), 29(6), Dec. 1943, pp. 397-404, 5 figs.

Review of the occurrence of these parasites in America and statement of their incidence (c. 40 percent) in hares collected in New York. Discussion of the nomenclature and proposal of the new name Protostrongylus boughtoni to replace P. leporis, preoccupied. Synonymy, description, measurements, illustrations, comparative notes. Quotation of Green and Shillinger's account of a study of hare lungworms in Minnesota and Wisconsin. Bibliography of 8 titles.

Diseases and Parasites: Nematoda, Skrjabinoptera

Morgan, Banner B. The nematode genus Skrjabinoptera Schulz, 1927, Lloydia (450 Ahnaip St., Menasha, Wis. $1.00 a copy), 5(4), Dec. 1942, pp. 314-319, 1 pl.

History of the genus, diagnosis, annotated list of 4 species to which a key is given. Most space is devoted to S. phrynosoma, a parasite of the horned "toads". Measurements and illustrations of all species and a host list are presented. Bibliography of 18 titles.

Diseases and Parasites: Pentastomida, Kiricephalus

Keegan, Hugh L. Observations on the pentastomid, Kiricephalus coarctatus (Diesing) Sambon 1910, Trans. Amer. Microscopical Soc. (James E. Ackert, Kansas State College, Manhattan), 62(2), April 1943, pp. 194-199, 1 pl.

Description of the eggs and larvae of this lung parasite of snakes, hosts of which are enumerated. Experimental efforts at infection failed. Notes on related species of the world and their hosts (snakes and frogs). Bibliography of 6 titles.

Diseases and Parasites: Protozoa, Coccidia

Carvalho, Jose C. M. The coccidia of wild rabbits of Iowa. I. Taxonomy and host-specificity, Iowa State College Journ. Sci. (Collegiate Press, Ames. $1.00 a copy), 18(1), Oct. 1943, pp. 103-135, 1 pl., 3 figs., 6 tables.

Failure of cross infections indicates distinctness of species of the Eimeria of different rabbits. The history of knowledge of these parasites is briefed and a bibliography of 24 titles presented. Materials and methods of the study are described. The coccidia of the tame rabbit, the Mearns cottontail, and the white-tailed jack rabbit are listed and described, and their synonymy and distribution indicated; similar treatment is given for the Eimeria of other rabbits and hares as a group. A key is presented to 21 species and forms known from these animals and an account given of the author's experiments with cross infections. There is a host catalogue of species of the genus Eimeria occurring in rabbits and hares. Two species and two forms are described as new.

Diseases and Parasites: Protozoa, Coccidia

Carvalho, Jose C. M. The coccidia of wild rabbits of Iowa. II. Experimental studies with Eimeria neoleporis Carvalho, 1942, Iowa State College Journ. Science (Collegiate Press, Ames, Iowa. $1.00 a copy), 18(2), Jan. 1944, pp. 177-189, 1 pl., 1 fig., 5 tables.

While WILDLIFE REVIEW does not, as a rule, draw attention to accounts of laboratory experiments, an exception is made in this case because part of the studies to increase knowledge of life history of the parasite and immunity of hosts were made with cottontails. Bibliography of 5 titles.

Diseases and Parasites: Protozoa, Giardia

Herman, Carlton M. Giardia in the blood of a kangaroo rat, Journ. Parasitology (Science Press, Lancaster, Pa. $1.50 a copy), 29(6), Dec. 1943, p. 423.

In Dipodomys heermanni, Madera County, California.

Diseases and Parasites: Protozoa, Suctoria

Goodrich, James P., and Theodore L. John. Epizoic Suctoria (Protozoa) from turtles, Trans. Amer. Microscopical Soc. (James E. Ackert, Kansas State College, Manhattan), 62(3), July 1943, pp. 245-253, 2 pls.

"A partial survey of the Suctoria in the region of Lake Okoboji," Iowa. Three new genera, their genotypes, and three other new species are described and illustrated. All from the carapace of the painted turtle (Chrysemys picta belli).

Diseases and Parasites: Protozoa, Trypanosoma

Wood, Sherwin F. A new locality for Trypanosoma vespertilionis (= T. cruzi ?) in bats in the United States, Journ. Parasitology (Science Press, Lancaster, Pa. $1.50 a copy), 29(5), Oct. 1943, p. 363.

In Antrozous pallidus pacificus from California.

Diseases and Parasites: Siphonaptera

Augustson, G. F. Contributions from the Los Angeles-Museum Channel Islands Biological Survey. No. 20. Three new fleas (Siphonaptera), Bul. Southern Calif. Acad. Sci. (Los Angeles County Museum, Exposition Park, Los Angeles, Calif.), 40(2), May-Aug. 1941, pp. 101-107, 2 pls.

Opidasys nesiotus n. sp. and Catallagia vonbloekeri n. sp. from Peromyscus maniculatus; Myodopsylloides pierceí n. gen. and sp. from Antrozous pallidus and Corynorhinus rafinesquii; descriptions, illustrations, host records.

Diseases and Parasites: Siphonaptera

Augustson, G. F. Some new California Siphonaptera, Bul. Southern Calif. Acad. Sci. (Los Angeles County Museum, Exposition Park, Los Angeles, Calif.), 40(3), Sept.-Dec. 1941, pp. 140-146, 1 pl.

Monopsyllus eutamiadis n. sp. from Eutamias quadrivittatus; Catallagia rutherfordi n. sp. from Microtus montanus and Peromyscus maniculatus; Phalacropsylla monticola n. sp. from Ochotona schisticeps; and a previously described species from P. maniculatus; descriptions and illustrations.

Diseases and Parasites: Siphonaptera

Augustson, C. F. Ectoparasite-host records from the Sierran region of east-central California, Bul. Southern Calif. Acad. Sci. (Los Angeles County Museum, Exposition Park, Los Angeles, Calif.), 40(3), Sept.-Dec. 1941, pp. 147-157.

Annotated list of species showing the localities, hosts and dates of collection. The list includes: Coleoptera, Diptera, Anoplura, Siphonaptera, and Acarina.

Diseases and Parasites: Siphonaptera

Augustson, C. F. Preliminary records and discussion of some species of Siphonaptera from the Pacific Southwest, Bul. Southern Calif. Acad. Sci. (Los Angeles County Museum, Exposition Park, Los Angeles, Calif.), 42(2), May-Aug. 1943, pp. 69-89.

Annotated list of species indicating localities and hosts with additional remarks upon some of them. Bibliography of 45 titles.

Diseases and Parasites: Siphonaptera

Joyce, C. R., and Gaigus W. Eddy. A list of fleas (Siphonaptera) collected at Tama, Iowa, Iowa State College Journ. Science (Collegiate Press, Ames. $1.00 a copy), 18(2), Jan. 1944, pp. 209-215.

Annotated catalogue of 16 species, with records of the hosts and a host index covering 18 species of mammals.

Diseases and Parasites: Siphonaptera, Amphipsylla

Augustson, C. F. The allotype of Amphipsylla neotomae I. Fox, 1940 (Siphonaptera: Dolichopsyllidae), Bul. Southern Calif. Acad. Sci. (Los Angeles County Museum, Exposition Park, Los Angeles, Calif.), 41(1), Jan.-April 1942, pp. 39-41, 2 figs.

From Spilogale gracilis arizonae; description, illustrations, comparative notes.

Diseases and Parasites: Siphonaptera, Delotelis

Augustson, C. F. A new flea from the Mojave Desert (California), Bul. Southern Calif. Acad. Sci. (Los Angeles County Museum, Exposition Park, Los Angeles, Calif.), 40(3), Sept.-Dec. 1941, pp. 138-139, 3 figs.

Delotelis mohavensis n. sp. from Neotoma lepida; description, illustrations.

Diseases and Parasites: Siphonapter , Geusibia

Augustson, G. F. The allotype of Geusibia ashcrafti Augustson 1941, Bul. Southern Calif. Acad Sci. (Los Angeles County Museum, Exposition Park, Los Angeles, Calif.), 40(3), Sept.-Dec. 1941, pp. 157-159, 3 figs.

Augustsonius, Hubbard, is a synonym of Geusibia, Jordan; description and illustrations of male from Ochotona schisticeps.

Diseases and Parasites: Siphonaptera, Orchopeas

Augustson, G. F. A new subspecies of Orchopeas sexdentatus (Baker), Bul. Southern Calif. Acad. Sci. (Los Angeles County Museum, Exposition Park, Los Angeles, Calif.), 42(1), Jan-April 1943, pp. 49-51, 1 pl.

O. s. neotomae n. subsp. from Neotoma lepida devia, Arizona; description, illustration, comparative notes.

Diseases and Parasites: Trematoda, Leucochloridiomorpha

Allison, Leonard N. Leucochloridiomorpha constantiae (Mueller) (Brachylaemidae), its life cycle and taxonomic relationships among digenetic trematodes, Trans. Amer. Microscopical Soc. (James E. Ackert, Kansas State College, Manhattan), 62(2), April 1943, pp. 127-168, 2 pls.

Review of world literature on the group (2-1/2 pages of titles cited). Account of the life history which was completed experimentally. Natural hosts, the black duck and the snail, Carpeloma decisum. The genus and subfamily named in the title are redefined and assigned to a new taxonomic position.

Diseases and Parasites: Trematoda, Sphyranura

Hughes, R. Chester, and George A. Moore. Sphyranura euryceae, a new polystomatid monogenean fluke from Eurycea tynerensis, Trans. Amer. Microscopical Soc. (James E. Ackert, Kansas State College, Manhattan), 62(3), July 1943, pp. 286-292, 1 pl.

Oklahoma. Original description, measurements, illustrations; discussion of previously described species of the genus, all from salamander hosts. Bibliography of 6 titles.

Diseases and Parasites: Of cottontail

Herman, Carlton M., and Harry A. Jankiewicz. Parasites of cottontail rabbits on the San Joaquin Experimental Range, California, Journ. Wildlife Management (P. F. English, 206 Forestry Bldg., State College, Pa. $1.00 a copy), 7(4), Oct. 1943, pp. 395-400, 1 table.

Reports upon autopsies of 44 specimens, 20 of which were kept alive varying periods for experimental purposes. Six types of coccidians were found

and are described. Captive animals proved moderately susceptible to infection with Eimeria stiedae from the domestic rabbit. Protozoans of two other genera, 4 species of nematodes, and 3 of cestodes also were disclosed; there is some discussion of each of them. Bibliography of 13 titles.

Diseases and Parasites: Of deer, white-tailed

Olsen

Fenstermacher, R., O. Wilford, and B. S. Pomeroy. Some diseases of white-tailed deer in Minnesota, Cornell Veterinarian (P. P. Levine, Cornell University, Ithaca, N. Y. 75 cents a copy), 33(4), Oct. 1943, pp. 323-332, 2 pls.

General report on findings from autopsies, as to the occurrence of ecto- and endo-parasites and of mechanical injuries and other pathological conditions. Most space is devoted to liver flukes, neoplasms, and bacteriological infections. Mortality occurs chiefly in winter as a result of malnutrition and cold. "It is quite evident that Minnesota deer have not been victims of any one specific disease factor other than the heavy liver fluke infection that occurs in several areas within the State."

Diseases and Parasites: Of grouse, blue

Boer, James. Parasites of the blue grouse, Journ. Wildlife Management (P. F. English, 206 Forestry Bldg., State College, Pa. $1.00 a copy), 8(1), Jan. 1944, pp. 91-92.

Report on parasites found on or in 128 Dendragapus fuliginosus collected in Washington and northern Idaho. The organisms treated include Mallophaga, Diptera, Nematoda, and Cestoda.

Diseases and Parasites: Of mink

Sealander, John A. Notes on some parasites of the mink in southern Michigan, Journ. Parasitology (Science Press, Lancaster, Pa. $1.50 a copy), 29(5), Oct. 1943, pp. 361-362, 1 table.

Incidence of 5 species of parasites in 158 specimens taken in two years. That of the sinus worm (Skrjabingylus nasicola) averaged 94 percent for the two periods; of the lungworm (Filaroides bronchialis), 19 percent; lung-fluke (Paragonimus kellicotti), 9; stomach worm (Physaloptera sp.), 4; and giant kidney worm (Dioctophyme renale), 3 percent. The coccidian, Isospora bigemina, and eggs of Capillaria sp., also were found.

Ecology: Bobwhite

Duck, L. G. Seasonal movements of bobwhite quail in northwestern Oklahoma, Journ. Wildlife Management (P. F. English, 206 Forestry Bldg., State College, Pa. $1.00 a copy), 7(4), Oct. 1943, pp. 365-368, 1 fig., 2 tables.

The author studied a reported winter shift from upland pastures to the better cover of the bottomlands and sand dunes. These areas and their cover and the methods of the study are described. Censuses showed average population decreases in the upland habitat in three years to be 67, 62, and 60 percent. The move involves considerable distance (several miles) and is a departure from the sedentary habit of the bobwhite reported from most of its range. Author's conclusion: "Sufficient evidence is available to show a distinct seasonal shift from summer to winter range with bobwhite quail populations in northwestern Oklahoma. It appears that these movements are intensified during winters of severe weather, indicating that the movement is forced, and represents a seasonal adaptation to the varied types of quail range. Obviously this movement factor is important in management, and calls for closer examination of conclusions as to the distances traveled by hatchery released birds in this same general area."

Ecology: Bog and swamp

Aldrich, John W. Biological survey of the bogs and swamps in northeastern Ohio, American Midland Naturalist (Notre Dame, Indiana. $1.00 a copy), 30(2), Sept. 1943, pp. 346-402, 21 figs., 8 tables.

Treats the plants and vertebrates in a detailed ecological manner. "For all practical purposes it is probably better not to consider any vertebrate animal exclusive to any community x x x but rather as more or less characteristic of it." Bibliography of 45 titles.

Ecology: Census methods, pheasant

McClure, H. Elliott. Censusing pheasants by detonations, Journ. Wildlife Management (P. F. English, 206 Forestry Bldg., State College, Pa. $1.00 a copy), 8(1), Jan. 1944, pp. 61-65, 5 tables.

Pheasants respond to various sounds by crowing. Of those tested, the detonation of small aerial bombs gave results most promising for use in censusing. Wind was the greatest interfering factor and, if of a velocity of 5 miles or more per hour, precluded success. An account of tests is given. In 5 minute counts, nearly three-fourths of the cocks present in a test area were heard to crow. Response was greatest between 6 and 7 A.M. and 5 and 6 P.M.

Ecology: Censuses, importance of

Cahalane, Victor H. Practical application of mammalian population studies, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg, 10 cents a copy), 14(9), Dec. 1943, pp. 10-11, 1 photo.

"Reasonably accurate population estimates are essential to the wildlife and game administrator." They are worth far more than what they cost. The author discusses wildlife numbers in relation to the maintenance of animal ranges, to the protection of crops, forest management, control of competition and of overpopulation, preservation of rare or threatened species, suppression of animal pests, and regulation of hunting.

Ecology: Cruising radius

Leopold, Aldo. Home range, Wisconsin Conservation Bulletin (Wisconsin Conservation Department, Madison), 8(9), Sept. 1943, pp. 23-24, 1 fig.

Practical illustrations from the author's observations as to the nature of home range. "Science knows little about the home ranges of birds and mammals at various seasons: how big they are, what they must include; to what extent they are defended against trespass; whether they are reoccupied year after year. The commoner the bird or mammal, the less is usually known. Every good observer has a chance to discover new facts about home range."

Ecology: Fire

Garren, Kenneth H. Effects of fire on vegetation of the southeastern United States, Botanical Review (N. Queen St. & McGovern Ave., Lancaster, Pa. 50 cents a copy), 9(9), Nov. 1943, pp. 617-654.

This paper does not consider the relation of burning to wildlife, but its bibliography of 167 titles contains most of the important references and is a very useful aid to anyone who desires to make a thorough study of this subject.

Ecology: Overpopulations

Dalke, Paul D., and David L. Spencer. Development and land use on a private game preserve in southern Taney County, Missouri, Journ. Wildlife Management (P. F. English, 206 Forestry Bldg., State College, Pa. $1.00 a copy), 8(1), Jan. 1944, pp. 1-6.

Description and history of an area intermittently maintained as a game preserve since 1893. Deer and elk were introduced on fenced areas, became overabundant, and damaged the environment. Authors' conclusions: "The present tree cover is believed to be similar to original stands, especially as to density and composition, although many original 'balds' are now covered with red cedar. Overstocking with deer for a period of years has resulted in almost complete elimination of woody browse plants. The recovery of woody browse, particularly shrubs and vines, is much slower than [that of] the grasses. The deer herd has declined in vigor, and more recently in numbers, apparently through malnutrition, in spite of efforts to improve winter feed by artificial methods."

The term "Plimsoll line" (p. 5) is misused; deer, or browsing, line are available expressions that could have been correctly employed.

Ecology: Phenology

Glendenning, R. Phenology, the most natural of sciences, Canadian Field-Naturalist (I. L. Conners, Central Experimental Farm, Ottawa, Canada. 25 cents a copy), 57(4-5), April-May, 1943, pp. 75-78.

Phenology is "the study of the times of recurring natural phenomena." The author indicates the types of incidents that may well be recorded, suggests methods of handling records, and discusses the value of phenological data.

Ecology: Populations, bird

Hickey, Margaret B. Audubon Magazine's Seventh Breeding-bird Census, Audubon Magazine (1006 Fifth Ave., New York, N. Y. This supplement alone 20 cents a copy), 45(5), Sept.-Oct. 1943, Section 2, pp. 17-24.

Reports on 20 tracts, mostly in the eastern United States; for some of them, population figures for several consecutive years are given. With each installment, this series becomes increasingly valuable to the student of bird populations.

Ecology: Wildlife habitat

Osborn, Ben, and M. M. Kellogg. Wildlife occurrence and habitat conditions in Roger Mills and Custer counties, Oklahoma, Proc. Okla. Acad. Sci. (Guthrie), 33, 1943, pp. 41-43, 2 tables.

The study area and methods are described and the results tabulated. From the authors' conclusions: "There is no apparent relationship between the total abundance of wildlife and the combined abundance of habitat elements in the different land types, as indicated by the total frequency indices. There are, however, direct correlations between the frequency of certain species and particular habitat elements of importance to them. For example, the abundance of cottontail rabbits was in direct proportion to the amount of shrubby cover in the different land types, whereas the abundance of jackrabbits was in inverse ratio to this same habitat element. The quail population was concentrated principally in the mixed scrub type at the season of the survey, where (excepting the two isolated plots in forest bottom land) the greatest abundance of shrubby cover, herbaceous cover, and seeds for food occurred. The data suggest that the total of all habitat elements is not so significant in determining total wildlife abundance as is the presence or absence of certain critical elements for each particular species. General wildlife abundance within a particular land type perhaps can best be measured with respect to the normal population of the climax biota for the type, rather than by comparing numbers of species or total frequencies of one land type with another. Determination of these normal population levels for different biotic types is suggested as a fertile field for investigation. The significance of any conclusions drawn from the data presented herein is problematical because of the statistically small number of samples at hand. We believe, however, that the accumulation of a volume of comparable data from different localities, and from the same localities in different years, would give an insight into the relationships of animal populations to one another and to habitat conditions in the various major biotic communities. The habitat tallies indicate also which habitat elements are least abundant in each land type or locality and suggest which ones need most to be increased to provide optimum conditions for particular wildlife species." Bibliography of 7 titles.

Economics: Fur, Illinois

Mohr, Carl O. Illinois furbearer distribution and income, Illinois Natural History Survey Division (Urbana) Bul. 22(7), Sept. 1943, pp. 301-537, frontis. + 26 figs., 12 tables.

Review of previous estimates of the value of furs taken in Illinois. The present is based on fur-taker's monthly reports. The distribution of the principal fur animals of the State is mapped from trapper's records, and the importance of each species in the catch of 10 years is estimated and tabulated. Fur-takers' success analyzed and discussed. The total annual catch of the 8 most important fur animals averages 958,000 and the value of their pelts $1,067,500. Bibliography of 35 titles.

Economics: Toads, Oklahoma

Bragg, Arthur N. On the economic value of Oklahoma toads, Proc. Oklahoma Acad. Sci. (Guthrie, Okla.), 23, 1943, pp. 37-39.

General remarks on economic value but little specific information on food habits. The yearly value of individual Oklahoma toads in the destruction of insects is estimated as for: Bufo a. americanus $15; B. cognatus, $25; B. woodhousii fowleri, $18; and B. w. woodhousii, $35. "The prairie-inhabiting species occur in Oklahoma in much greater numbers than the American toad usually does in the East, so that in the aggregate, our toads are of much greater value than those of the East merely because there are many more of them." Bibliography of 6 titles.

Food Habits: Birds vs. orthoptera

Knowlton, G. F., and F. C. Harmston. Grasshoppers and crickets eaten by Utah birds, Auk (J. Fletcher Street, 1120 Locust St., Philadelphia, Pa. $1.00 a copy), 60(4), Oct. 1943, pp. 589-591.

Summary of the results of stomach analyses as to consumption of the insects noted, by 43 species and subspecies.

Food Habits: Birds vs. pea aphids

Knowlton, George F. Red-wings eat pea aphids, Auk (J. Fletcher Street, 1120 Locust St., Philadelphia, Pa. $1.00 a copy), 61(1), Jan. 1944, p. 138.

Agelaius phoeniceus fortis feeding extensively upon Macrosiphum pisi. Notes on other foods also are given.

Food Habits: Utilization of Ilex collina

Brooks, Maurice. Ilex collina fruits as bird food, Wilson Bulletin (J. Van Tyne, University of Michigan, Ann Arbor. 50 cents a copy), 55(4), Dec. 1943, p. 246.

Field observations in West Virginia; ruffed grouse, wild turkey, catbird, robin, wood and olive-backed thrushes, and cedarbirds reported to feed on the fruits.

Food Habits: Utilization of lichens

Perez-Llano, George A. Lichens--their biological and economic significance, Botanical Review (N. Queen St. & McGovern Ave., Lancaster, Pa. 50 cents a copy), 10(1), Jan. 1944, 65 pp.

In this comprehensive review of lichen literature (233 titles cited), appropriate space is given to reports on the use of these plants as food by animals, including caribous, wood buffalos, and musk-oxen. Attention is given to the conservation of lichen stands, to harvesting dry fodder from them, and to their use by domestic animals, especially the reindeer.

Food Habits: Utilization of seeds

Edminster, Frank C., and John R. Langenbach. Food for thought . . . and wildlife, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 14(10), Jan. 1944, pp. 8, 23-29, 4 photos, 1 table.

Tabulation and discussion of palatability ratings of potential foods for the quail and pheasant derived from tests with captive birds. [That the results of such experiments are not dependably indicative of natural conditions is shown by the verdict "no good" as a quail food on Galactia volubilis (No. 7 in rank in Martin's Quail-food Plants of the Southeastern States, U. S. Dept. Agr. Circ. 348, 1935), and Strophostyles helvola and S. umbellata (Ibid., No. 22); Chamaecrista nictitans and Lespedeza virginica (recorded as a quail food by Stoddard, et al., The Bobwhite Quail, etc., 1931; see also Davison, Journ. Wildlife Management, 4(2), April 1940, p. 106.)] Nutritional tests also are reported upon. The seeds of early shrub lespedeza (L. cyrtobotrya) may be considered as having a high rating for the quail and those of reed canary grass (Phalaris arundinacea) for the pheasant. The merits of other species and the use of the leading kinds in field borders are discussed.

Food Habits: Utilization of spruce carpels

Brooks, Maurice. The carpels of red spruce blossoms as food for birds, Wilson Bulletin (J. Van Tyne, University of Michigan, Ann Arbor. 50 cents a copy), 55(4), Dec. 1943, pp. 245-246.

Field observations in West Virginia; the carpels were eaten by red, and white-winged, crossbills, pine siskins, and cedar birds.

Food Habits: Yield of waterfowl foods

Low, Jessop B., and Frank C. Bellrose, Jr. The seed and vegetative yield of waterfowl food plants in the Illinois River valley, Journ. Wildlife Management (P. F. English, 206 Forestry Bldg., State College, Pa. $1.00 a copy), 8(1), Jan. 1944, pp. 7-22, 1 pl., 5 figs., 3 tables.

Authors' summary: "(1) The seed productivity of 28 waterfowl food plants in the Illinois River Valley was measured by 790 samples and the foliage production of 6 submerged species also was determined; (2) the samples were taken from 19 lakes, 3 with characteristically stable water levels, 7 with semistable water levels, and 9 with fluctuating water levels; (3) the average seed yield was 101.2 cc. per square meter of plants, or about 14 bushels of seed per acre. Foliage production averaged 127 grams dry weight per square meter, or about 975 pounds an acre; (4) of the seven heaviest seed producers, six were emergent or moist-soil plants and one, a submerged species, the longleaf pondweed (Potamogeton americanus). Millets (Echinochloa crusgelli and E. frumentacea) were the highest seed producers with 457 and 455 cc. per square meter. Other plants high in yield were buttonbush (Cephalanthus occidentalis), pickerelweed (Pontederia cordata), and Walter's millet (Echinochloa walteri); (5) weight of air-dried foliage samples of submerged aquatics collected under optimum growing conditions showed coontail (Ceratophyllum demersum) to be the heaviest producer and longleaf pondweed and sago pondweed (Potamogeton pectinatus) next in order; (6) environmental and edaphic factors affected the normal yields of seeds and foliage. Foremost among these were water depth, water transparency, and soil type. Such plants as longleaf pondweed, duck potato (Sagittaria latifolia), bur-reed (Sparganium eurycarpum), and marsh smartweed (Polygonum muhlenbergii), thriving in different water depths of several lakes, varied considerably in yield of seeds. Turbidity resulting from suspended silt in the water decreased seed yields of sago pondweed and retarded development of other submerged plants. Certain plants typically grew on sandy soils but a majority of the aquatics attained optimum seed productivity in lakes on black silt loams; (7) plant competition affected the amount of seeds produced. In general, uniform and medium stands produced the highest yields of seed and should be encouraged in planting programs or in management practices where plant densities can be controlled. The potentially high yield of wild rice (Zizania aquatica), and probably that of other species, is lowered materially by worms which consume the seeds." Bibliography of 7 titles.

Food Habits: Of chickadee, black-capped

Danforth, Ralph E. Winter insect food of chickadees, Auk (J. Fletcher Street, 1120 Locust St., Philadelphia, Pa. $1.00 a copy), 60(4), Oct. 1943, p. 595.

Nymphs of sumac psyllids or jumping plant lice (Calophya spp.).

Food Habits: Of coyote

Crater, Russell K. Coyote foods near Boulder Dam, Journ. Wildlife Management (P. F. English, 206 Forestry Bldg., State College, Pa. $1.00 a copy), 7(4), Oct. 1943, pp. 422-423.

Report on items identified in 176 scats; leading are remains of rabbits, wood rats, mice, and mesquite beans. Few birds were taken and the remains of large mammals were apparently from carrion.

Food Habits: Of deer, white-tailed

Pearson, Allen M. White-tails like acorns, Alabama Conservation (Alabama Dept. of Conservation, Montgomery), 15(6), Dec. 1943, pp. 8-9, 12, 9 photos, 1 table.

Report upon analyses of samples of the stomach contents of 195 deer collected in 6 years. The food items identified are tabulated both as to volume and frequency of occurrence. Acorns, with a small proportion of oak leaves, comprised nearly half of the total bulk of the food. Leaves, fruits, and stems of greenbriers (Smilax) contributed 8.83 percent, and those of sumacs (Rhus), 4.66 percent, of the food samples. Suggestions are made as to the management of deer range.

Food Habits: Of dove, mourning

Leopold, A. Starker. Autumn feeding and flocking habits of the mourning dove in southern Missouri, Wilson Bulletin (J. Van Tyne, University of Michigan, Ann Arbor. 50 cents a copy), 55(3), Sept. 1943, pp. 151-154, 1 table.

Author's summary: "The autumn feeding and flocking habits of Mourning Doves were studied in south-central Missouri from 1939 through 1942. Mourning Doves, being unable to scratch or to cling to vertical stalks, select their food from seeds available on the surface of the ground. The periodic adjustments in their fall feeding habits are apparently conditioned by changing availability of surface foods. Wheat fulfills the Mourning Dove's needs until the stubbles become nearly exhausted. The birds then change to foxtail if a crop has been produced; if not, they make shift on the stubbles until the later weeds and crops ripen. Mourning Doves apparently reject Korean lespedeza, although quail prefer it. Part of the local Mourning Doves migrate, and an increasing degree of gregariousness is evident among the remaining birds. Winter concentrations begin to form on the best feeding grounds in September. There is a tendency toward sexual segregation among the wintering doves, some of the adult males forming into separate flocks."

Food Habits: Of eagle, golden

Couey, Faye. Golden eagle vs. bighorn sheep, Montana Wildlife Bulletin (Montana Fish & Game Commission, Helena), 1(1), pp. 2-3, 2 photos.

Report on observations of a nest where ground squirrels were the main food items (others are noted) and review of the results of other investigators. Summarizing, it would seem from "the meager evidence presented against it as a predator on Bighorn Sheep, that the Golden Eagle should not be considered as a limiting factor to the increase of mountain sheep."

Food Habits: Of flicker

Moore, W. H. The golden-winged woodpecker, Colaptes auratus L., feeding upon the fruit of buckthorn, Acadian Naturalist (University of New Brunswick, Fredericton, N. B., Canada. 50 cents a copy), 1(3), Nov. 1943, pp. 74-75.

Notes on the life-history of the flicker and upon its food, particularly the berries of Rhamnus frangula.

Food Habits: Of fox, kit

Haybecker, Albert C. Food of the San Joaquin kit fox, Journ. Mammalogy (Ernet T. Hooper, University of Michigan, Ann Arbor. $1.00 a copy), 24(4), Nov. 1943, p. 499.

Report on analysis of 74 scats collected in San Benito County, California. Grass was present in all the scats and a single abundant kind of grasshopper in 66. Remains of kangaroo rats were common and those of beetles and Jerusalem crickets were of lesser frequency. Scientific names are given for the food items identified.

Food Habits: Of fox, red

Scott, Thos. G. Some food coactions of the northern plains red fox, Ecological Monographs (Duke University Press, Durham, N. C. $1.50 a copy), 13(4), Oct. 1943, pp. 427-479, 32 figs., 16 tables.

This most thorough report upon the food habits of a fox that has been published describes the range on which the study was conducted and gives a comprehensive synopsis of the foods available there. Fox tracks, scats, and other "sign" are fully treated and illustrated. Methods used in the study are described. Observations on the home range, movements, and life of the fox are recorded but food habits, as indicated by the title, receive most attention. Hunting methods of the fox, food caches, food utilization, feeding trends and preferences, relation of home range and diet, and the identity and frequence of taking of food items are systematically treated. Paragraphs from the author's summary: "The feeding tendencies were investigated by analysis of fecal passages because the number of samples available made possible a continuous determination of the relative proportions of the foods consumed. During the study, 1,454 fecal passages were collected and analyzed; 234 of these were picked up at dens. The red foxes were found to be primarily carnivorous, consuming substantial quantities of insect and plant foods when available. Warm-blooded vertebrates were less frequent in the warm weather diet than in the cold weather diet, whereas the reverse was true of insects and plant foods. The principal staple foods were cottontails and mice, especially Peromyscus and Microtus. The red foxes seemed to possess these food preferences: The meadow mouse was high on the scale of preferences, insectivores and weasels were regularly left uneaten, weasels appeared to be particularly unsatisfactory as food, and carrion that was advanced in decay did not seem to be attractive food for the foxes. These differences were noted in a comparison of the frequency of occurrences of the principal food groups in the fecal passages from the trails and those from the dens: In April, when the pups were most dependent upon the adults for food, the remains of warm-blooded vertebrates were more frequent in the fecal material from the dens than in that from the trails, and limited occurrences of invertebrate and plant remains were detected in passages from the trails while neither were found in passages from the dens; in May, when the pups were presumably less dependent on the adults, warm-

blooded vertebrates were not so frequent in the den material and were more frequent in that from the trails, while the invertebrate and plant representation markedly increased in the passages found at the dens. Within the limits of its fundamentally carnivorous nature the red fox was mainly influenced in its feeding by availability of foods, and on the whole the proportions of individual food items seemed more to reflect relative than specific availability. Fluctuations in the frequency of occurrences of some foods for which no appreciable change in availability was evident resulted simply because other foods became relatively more or less available. There seemed to be no important lack of utilization of suitable foods as foxes ate carrion not too far advanced in decay and frequently items that they killed and did not eat were readily consumed by animal associates. So far as could be determined foxes did not exert a dominant influence on the populations of the prey animals regularly consumed for the direction of seasonal and annual population trends seemed to continue unchanged by the pressure of fox predation." Bibliography of 42 titles.

Food Habits: Of fox, western red

Livezey, Robert, and Fred Evenden, Jr. Notes on the western red fox, Journ. Mammalogy (Emmet T. Hooper, University of Michigan, Ann Arbor. $1.00 a copy), 24(4), Nov. 1943, pp. 500-501.

Identifications of prey remains at a den near Corvallis, Oregon, including ground squirrels, rabbits, and a bird. Description of the den.

Food Habits: Of jay, green

Davis, J. B. Robbers on the Rio Grande, Texas Game and Fish (110 E. Ninth St., Austin, Tex. 10 cents a copy), 2(1), Dec. 1943, p. 8, 2 photos.

Xanthoura luxuosa glaucescens. Notes on feeding habits, especially egg-eating. "Green jays and grackles have been known to destroy more than 50% of all eggs in a nesting colony of whitewings" (doves). The jays are readily trapped.

Food Habits: Of mink

Sealander, John A. Winter food habits of mink in southern Michigan, Journ. Wildlife Management (P. F. English, 206 Forestry Bldg., State College, Pa. $1.00 a copy), 7(4), Oct. 1943, pp. 411-417, 2 tables.

Author's summary: "A study of 102 stomachs and 101 intestines of mink from southern Michigan taken during the legalized trapping season in December over a four-year period yielded results as follows: Mammals constituted over 50 per cent of the winter food by bulk and by frequency. The remainder consisted of birds, snakes, frogs, fish, crayfish, and insects. Muskrat was the most important individual prey item; cottontail ranked second and meadow mouse third. Of lesser importance were deer mice, pheasants, green and leopard frogs and crayfish. Nonfood items present were mixtures of dirt and black protein

waste, vegetation, and debris. Differential rates of passage for hard and soft parts of prey were indicated, the former reaching the intestine more rapidly. Males took significantly more muskrats than did females; the reverse was true for smaller food items. The size of a mink may determine the size of its prey. Females, because of their smaller size, may deliberately select smaller prey, whereas large powerful males may do the opposite. The wider ranging males also may encounter muskrats more frequently than do the females."

Food Habits: Of owl, snowy

Gross, Alfred O. Food of the snowy owl, Auk (J. Fletcher Street, 1120 Locust St., Philadelphia, Pa. $1.00 a ~~copy), 61(1),~~ Jan. 1944, pp. 1-18, 1 pl., 8 tables.

During 4 invasions since 1926, 205 birds were received at Bowdoin College. Analyses of the contents of 137 of these that contained food are here summarized along with those of 32 collected in Ontario, 24 in New York, and 60 in Pennsylvania. Identified prey is listed and discussed. Data are presented on the weights of the food items in 69 stomachs and of the entire contents of 9 others. A great number of field observations also are reported. "In summing up the results of the stomach examinations and field observations of food habits, the evidence is about equally for and against the Snowy Owl so far as the economic interests of man are concerned. The species is beneficial by reason of its destruction of mice and, especially, that most despised of all rodents, the Norway rat, but it is also very destructive to game and song birds, poultry, and certain useful mammals. The total number of birds and useful mammals that are eaten is just about equal to the number of destructive mammals, and hence little can be claimed in favor of the Snowy Owl on the basis of its food habits." Bibliography of 35 titles.

Food Habits: Of owls

Pearson, T. Gilbert. Hoo's hoo!, Field and Stream (515 Madison Ave., New York, N. Y. 25 cents a copy), 48(7), Nov. 1943, (Oct.), pp. 32-33, 78-79, 7 photos.

Popular discussion of superstitions about owls, habits of the birds, and their food. Most of the common species are referred to and a moderate point of view is taken as to their predation.

Food Habits: Of pheasant

Cowan, Ian McTaggart. Economic status of the pheasant on the cultivated lands of the Okanagan Valley, British Columbia, Provincial Game Commission (Victoria, B. C., Canada), Report 1942, pp. 49-62, 3 tables, 1943.

Description of the area where truck-gardening is an important industry. At the time of the study the pheasant population was one bird to 1.5 acres; the sex ratio was about 1:4 or 5. Report is made on analyses of the contents of 132 crops. The food was predominantly vegetable (from 92 to 100 percent by months), animal food averaging only 2 percent. Weed seeds constituted 44 per-

cent of the total food, greens 17, grain 13, and potatoes and roots 11, percent. All of the food items identified are listed by both scientific and vernacular names. The damage to crops is not considered serious excepting that to tomatoes. Under the most favorable marketing conditions, it may be as high as $20 per acre. Counterbalancing values of the pheasants are discussed. "It would appear that except under special circumstances the positive values outweigh the negative even from the standpoint of most agriculturists, provided that they share in the pheasant harvest." "To a few, because of special crop and market conditions, the pheasants may occasion considerable financial loss. These cases can be dealt with by a liberal application of existing regulations permitting destruction of game where damage is being done. If the growers of tomatoes and the few other crops occasionally receiving heavy damage can be persuaded to share in the pheasant harvest by leasing shooting rights, the moneys received from this source over a period of years will, in large part, offset the pheasant-damage, as the latter will occur only occasionally as a result of fluctuating market and labour conditions. From the standpoint of the community at large there seems little doubt that the pheasant can be considered an asset."

"These findings suggest that the economic position of the pheasant in the Vernon district is not such as to necessitate any widespread control measures. Where control of pheasants damaging crops is necessary the circumstances are local and sporadic and should be dealt with accordingly. Possibly some shooting of hens might be permitted during the open season, for in this way some of the large number of hens that are annually removed from the population by forces other than legal hunting would be harvested. While it is doubtful if the total autumn population of pheasants would be much affected, the per acre value of the pheasant crop would be augmented." Bibliography of 5 titles.

Food Habits: Of pipit

Knoulton, George F. Pipits eat injurious insects, Auk (J. Fletcher Street, 1120 Locust St., Philadelphia, Pa. $1.00 a copy), 61(1), Jan. 1944, pp. 137-138.

Report on the examination of 103 stomachs collected in Utah.

Food Habits: Of porcupine

Curtis, James D. Appraisal of porcupine damage, Journ. Wildlife Management (P. F. English, 206 Forestry Bldg., State College, Pa. $1.00 a copy), 8(1), Jan. 1944, pp. 88-91.

Review of the food habits of porcupines, especially in Maine where this study was made. Cruises revealed the animals present in numbers from 20 to 2[illegible] per square mile and damage to trees that was appraised at from 11.5 to 36 cents per acre. "Inasmuch as the stated losses resulted from the feeding to date, it is questionable if any costs for protection could be justified, unless volume increment per acre was substantially higher than the estimated average of 0.10 cord of spruce and fir per acre per year. Since porcupines return to trees on which they have fed previously, particularly hemlock, larch

(Larix laricina), and sugar maple, it is possible that a system of silvicultural treatment to retain these and perhaps some other 'weed' species would supplement a management plan and ultimately be cheap, sufficiently practical as to losses, and attuned to biological control which is believed by many ecologists to be the most desirable in forest management." Bibliography of 6 titles.

Food Habits: Of raccoon

Hendrickson, George O. Food habits of the raccoon, Iowa Conservationist (10th & Mulberry Sts., Des Moines, Iowa), 2(12), Dec. 1943, p. 95.

Summary of contents of 363 scats and 2 stomachs collected in Dubuque County in 1938. The food discussed by seasons was largely vegetable (77.73 percent) of which the major item was corn.

Food Habits: Of sparrow, chipping

Knowlton, George F., and Stephen L. Wood. Seasonal insect food of the western chipping sparrow, American Midland Naturalist (Notre Dame, Ind. $1.00 a copy), 30(3), Nov. 1943, pp. 783-785, 3 tables.

Partial report on the contents of 283 stomachs collected in Utah. Much information is given on the insects (particularly pests) eaten at various seasons but there is no summary of the proportions or numbers of either the plant or animal foods.

Food Habits: Of squirrel, red

Macnamara, Charles. An apparently unrecorded food of the red squirrel, Canadian Field-Naturalist (I. L. Conners, Central Experimental Farm, Ottawa, Canada. 25 cents a copy), 57(6), Sept. 1943, p. 107.

Winter buds of the staminate flowers of Thuja occidentalis, Ottawa Valley. Reference to other recorded usage of products of this tree.

Food Habits: Of tortoise, box

Moore, G. E. Food habits of the box tortoise, Missouri Conservationist (Missouri Conservation Commission, Jefferson City), 4(7), Oct. 1943, p. 12.

Hunters report that the tortoise breaks up bobwhite nests. The author noted the animals eating roaches and crickets (in a house), mash supplied to chickens, table scraps, leafy vegetables, fruits, and mushrooms.

Food Habits: Of weasel

Quick, H. F. Habits and economics of the New York weasel in Michigan, Journ. Wildlife Management (P. F. English, 306 Forestry Bldg., State College, Pa. $1.00 a copy), 8(1), Jan. 1944, pp. 71-78, 1 pl., 1 fig., 4 tables.

The findings as to economics are based on interviews with farmers and as to habits on field observations and scat analyses. Author's summary: "In one year weasels were reported to have killed 1.03 per cent of all chickens in one township in Michigan. They inflicted 59 per cent of the total damage to poultry by all forms of wildlife. Weasels were known to have entered 19 per cent of the chicken coops on the study area. Farmers killed 68 per cent of the weasels seen on farms during that year, although no bounty was paid as an incentive. Weasels invade barn areas mainly during the spring and early summer. As furbearers, weasels locally afford a lower total annual income than any other species. The winter food habits of weasels are beneficial to agriculture, since many mice are eaten. The selection of food items was roughly 65 to 70 per cent Peromyscus, 23 to 33 per cent Microtus, and 2 to 7 per cent of small birds. No significant damage to game species during the winter months was found. No reliable method of censusing was obtained. The home range of each weasel was about 300 acres, and the average cruising radius 0.3 mile from the den. The average daily travel distance is somewhat less than 2 miles. Each weasel used only one den throughout the winter. Individuals may remain in dens for periods of two or three days. Both weasels and mink were active during the coldest winter weather." Common rats caused the greatest losses among ducksand the fox among turkeys; minks and opossums were of minor importance as poultry killers.

Life Histories: Armadillo

Kalmbach, E. R. The armadillo: Its relation to agriculture and game. Texas Game, Fish, and Oyster Commission (Austin), 61 pp., colored frontispiece and 4 other pls., 4 figs., 2 tables, 1943.

The nine-banded armadillo has extended its range fairly rapidly since 1880, and being common in some localities, its economic status is of considerable interest. This publication summarizes laboratory and field investigations by the Fish and Wildlife Service involving some cooperation by the Texas Game, Fish, and Oyster Commission. Distribution and abundance and such life history subjects as anatomy, embryology and reproduction, burrows, nests and young, movements and feeding mannerisms, swimming ability and ingestion of air, and enemies, are discussed to a considerable degree from original observations. Food habits are very thoroughly treated on the basis of analyses of the contents of 281 stomachs and upon field investigations. Insects lead in the diet with 77.6 percent to which myriapods, spiders and their allies, miscellaneous invertebrates, and vertebrates add enough to make up the total of 93.3 percent of animal food. Berries, fungi, and vegetable debris composed the remainder (6.7 percent) of the stomach contents. A special study was made of the armadillo's relation to quail nests and although some losses were found attributable to this animal, the conclusion was reached that "under conditions of reasonable abundance, the birds would not be seriously affected." This investigation covered the eggs of poultry also and the general summary was, "While armadillos certainly destroy some eggs of ground-nesting birds, the extent of this predation is not considered excessive." Armadillos are used for food and also in the souvenir trade but in view of the increase and spread of the species, these inroads have not had a serious effect. Summary sentence: "In the light of the information here gathered it would appear that the armadillo,

when in moderate numbers, is not a menace either to agriculture or the the existence of ground-nesting birds." Bibliography of 40 titles.

Comment: The author is conservative in his conclusions. The reviewer, from his experience in examining armadillo stomachs, was impressed by the insect-destroying capacity of this creature. It is our most voracious consumer of insects, and if insect destruction is the criterion for evaluation of an animal's food habits, the ranking of the armadillo must be high.

Life Histories: Beaver

Anon. Beaver, engineers of the animal world, Iowa Conservationist (10th & Mulberry Sts., Des Moines, Iowa), 2(12), Dec. 1943, pp. 89, 91, 93, 5 photos.

Original occurrence of beavers in Iowa, the usual reduction, and re-establishment, principally by transplanting. Notes on life history and economic importance.

Life Histories: Bighorn, Desert

Carson, Richard. Man, the greatest enemy of desert bighorn mountain sheep, Texas Game and Fish (Texas Game, Fish, and Oyster Commission, Austin), 1(10), Sept. 1943, pp. 7, 15-16, 1 photo.

History, distribution, and destruction of bighorns in Texas. Competition with cattle is not, but with sheep is, serious. The latter is now the principal menace. Earlier hunting and disease were causes of great mortality. The present number of the animals is about 150. Notes on the life history and a list of food plants are given. Of the latter, buckbrush (Fendlera rupicola) is most important.

Life Histories: Brant

Cottam, Clarence, John J. Lynch, and Arnold L. Nelson. Food habits and management of American sea brant, Journ. Wildlife Management (P. F. English, 206 Forestry Bldg., State College, Pa. $1.00 a copy), 8(1), Jan. 1944, pp. 36-56, 2 pls., 1 fig., 4 tables.

The distribution of brant is outlined and the fluctuations in their populations discussed and illustrated by annual counts on certain areas. Failure of the former chief food supply, eel-grass, was a severe blow and in 1933-34 numbers of the brant on the Atlantic Coast had reduced by as much as from 90 to 98 percent. By separate tabulations, the great differences in the food prior, and subsequent, to the eel-grass depletion are illustrated. Consumption of this plant dropped from 85 to 16 percent of the food by bulk. Food utilized on the west coast is independently analyzed and discussed. Eel-grass is the most important item there also. Feeding habits are described from field observations and information in the literature is summarized. Flight, migrations, weights, and nesting are treated and management and shooting discussed. Bibliography of 37 titles.

Life Histories: Chipmunk

Criddle, Stuart. The little northern chipmunk in southern Manitoba, Canadian Field-Naturalist (I. L. Conners, Central Experimental Farm, Ottawa, Canada. 25 cents a copy), 57(4-5), April-May 1943, pp. 81-86, 2 figs., tables.

Eutamias minimus borealis. Distribution, appearance, measurements, weight, sex ratio, voice and its use, breeding, cleanliness, use of water, longevity, periodicity, food and its storage, burrows, hibernation, and economic importance.

Life Histories: Grouse, Ruffed

Bezdek, Hubert. Sex ratios and color phases in two races of ruffed grouse, Journ. Wildlife Management (P. F. English, 206 Forestry Bldg., State College, Pa. $1.00 a copy), 8(1), Jan. 1944, pp. 85-88, 2 tables.

Author's summary: "Data are given on sex ratios, color phases, and adult-juvenile ratios of 380 live-trapped ruffed grouse, involving two subspecies, released for stocking purposes in 12 unglaciated counties of Ohio. Canadian birds were primarily of gray individuals; those from Wisconsin of the red or rufous phase, with the grays next in numbers. Nearly twice as many were intermediate in the Wisconsin stock as in that from Canada. Both races showed about equal sex ratios for combined age classes and color phases, although there were slightly more males in the latter case. Despite differences in winter trapping methods in the two areas, the total average sex ratios were nearly identical; therefore, over long periods, the sex ratios in the ruffed grouse taken by trapping were about equal. Calculations based upon this work, previous papers, and those of other investigators reveal that 80 per cent of the wild ruffed grouse population does not exceed the age of 22 months." Bibliography of 13 titles.

Life Histories: Grouse, Sage

Honess, Ralph F., et al. Sage grouse studies. Bul. 2, Wyoming Game and Fish Dept. (Cheyenne), 27 pp., 6 pls., 2 tables, 1942.

This pamphlet includes two papers: "Structure and function of the neck muscles in inflation and deflation of the esophagus in the sage grouse," by Ralph F. Honess and Warren J. Allred; and "Seasonal and sexual dimorphic variations in the so-called 'air sacs' region of the sage grouse," by L. Floyd Clarke, Hermann Kalm, and Malcolm D. Martin. They have to do with a characteristic sound made by the sage cock in its courting performance and the mechanism for producing it. A good technical paper to which one misses reference is George L. Girard's essay on the "Life history, habits, and food of the sage grouse" (Univ. Wyoming Publ. in Science, 3(1), 56 pp., 20 figs.), which despite its fairly recent date of 1937 must be recognized as the pioneer (as it is still the most comprehensive) paper on this bird. Omitted also is citation to John J. Scott's article "Mating behavior of the sage grouse"

(Auk, 59(4), Oct. 1942, pp. 477-498, Pls. 15-17) in which the same phenomenon discussed in "Sage grouse studies", is treated at some length and illustrated.

Life Histories: Mallard

Munro, J. A. Studies of waterfowl in British Columbia. Mallard, Canadian Journ. Research (National Research Council of Canada, Ottawa), D. 21, 1943, pp. 225-260, 2 figs., 15 tables.

Another in the excellent series by this author that is treating the waterfowl of British Columbia more fully, and on the basis of more original investigation, than has been done for any other region. This essay on the most widely distributed, most hunted, but still increasing species, the mallard, discusses the bird's: distribution and seasonal movements, reproduction, restrictive factors, sex ratio, food and feeding habits, and economic status. Hunters' expenditures in the Province, for which pursuit of mallards is a large incentive, are estimated at nearly two million dollars for equipment, and nearly a million for annual expenses, some $140,000 of which is for license fees. From the author's summary on economic status: "On the coast one winter population feeds chiefly on seeds and vegetation, secured on flooded fields; another feeds exclusively on salmon eggs and salmon flesh; a third occupying the littoral, on algae and small marine animals. In the interior the seeds of aquatic plants, more particularly Scirpus acutus and Potamogeton pectinatus are important foods, so are aquatic insects chiefly Odonata nymphs and corixids. One population in autumn lives almost entirely on grain secured from the fields. The mallard is the duck species of greatest economic importance in British Columbia and the source of a considerable item of revenue to the province. This value is believed to outweigh an economic loss of undetermined proportion brought about by the mallards' consumption of salmon eggs and damage to agricultural crops."

Life Histories: Mouse, Meadow

Bailey, Vernon. Mouse plagues, Nature Magazine (1214 Sixteenth St., N. W., Washington 6, D. C. 35 cents a copy), 37(2), Feb. 1944, pp. 77-79, 4 illus.

Description of the outbreak at Lovelocks, Nevada, in 1907, including damage by the mice, behavior of predators, and steps taken toward its control. Notes on the care and behavior of meadow mice in captivity. Copulation occurred almost immediately after parturition so that there was a new litter every 21 days. The broods varied from 6 to 8 and were about equally divided as to sex. The young females had their first young when about 45 days old. These data are the basis of the author's estimate of the potentiality of a million or more mice being bred in a year from a single initial pair. Suggestions are given as to cultural methods of controlling meadow mice. These animals are "the most important food supply of owls, hawks, foxes, skunks, weasels, and many other animals that are of value when well fed but a menace when hungry."

Life Histories; Mouse, Pine

Jefferson, R. M. Notes on the pine mouse, Virginia Fruit (W. S. Campfield, Crowle Bldg., Staunton, Va.), 31(5), May 1943, pp. 10, 12, 14, 1 fig.

Description of burrows and sketch of those under a single apple tree. The number of mice per tree in the orchard (near Stuart, Va.) ranged from 1 to 12 and averaged 3-4. The mice bred to some extent during the winter. The number of young in a litter varied from 1 to 3 with an average of 2. A list is given of items found in food caches.

Life Histories: Peccary

Mauermann, Robert. The javelina in Texas, Texas Game and Fish (110 E. Ninth St., Austin, Tex. 10 cents a copy), 2(1), Dec. 1943, pp. 5, 23-25,2 photos.

Appearance, measurements, weights (44-46 pounds), range, life history, food habits, and scent gland. Reduction by hide- and sport-hunting and prospects for conservation.

Life Histories: Pheasant

Carlson, C. Edward. Unusual pheasant nests from Minnesota, Flicker (Arnold B. Erickson, University of Minnesota, Minneapolis), 15(3), Oct. 1943, pp. 29-31.

Nest 21-1/2 feet high based on that of a crow (records of 8 tree nests in the literature are reviewed); hens incubating up to 85 days in vain attempts to hatch a clutch; pheasants laying eggs in nests of several other kinds of birds. Bibliography of 9 titles.

Life Histories: Pheasant

Leopold, Aldo, Theodore M. Sperry, William S. Feeney, and John A. Catenhusen. Population turnover on a Wisconsin pheasant refuge, Journ. Wildlife Management (F. F. English, 206 Forestry Bldg., State College, Pa. $1.00 a copy), 7(4), Oct. 1943, pp. 383-394, 1 fig., tables.

The methods of this study on the University of Wisconsin Arboretum are described and the findings are discussed. Authors' summary: "Five consecutive bandings of a protected pheasant population indicate that each annual increment of grown young shrinks to zero by its fifth winter. The turnover period is thus about five years. The intervening survival is represented by the series 100-30-9-1.8-0. This series resembles those reported for Hungarian partridge, California quail, and snowshoe hare. The shrinkage or turnover rate between winters is about 70 per cent. Its uniformity suggests that once a bird reaches its first winter, its chance of survival does not improve with age. The 100-30-9-1.8-0 survival series implies an age composition of 71-21-6-1-0 per cent of birds 1/2, 1-1/2, 2-1/2, 3-1/2, and 4-1/2 years old, respectively. The turnover period in cocks is three years; pheasants older

than this are all hens. This inferior survival in cocks probably accounts for the 40:60 sex ratio. The percentage of cocks decreased during the study period, perhaps because of growing density and increased fighting. A 15:85 ratio prevails on the hunted ranges of the same county. These data on survival, age composition, and sex ratio imply a mortality of 84 per cent among young pheasants between hatching and winter. Cocks are harder to trap than hens. One of every seven banded pheasants and one of every 20 catches were killed in the traps, mostly by dogs. This loss was the equivalent of light shooting. Cocks lost weight from December through April. Hens lost weight from December through March, but regained their loss in April. Different years produce pheasants of different weights. Trapping and banding in the nearest outside marsh showed no winter-to-winter shift of banded birds to or from the study area." Bibliography of 14 titles.

Life Histories: Rat, Roof

Milmore, B. K. Harborage of Rattus rattus alexandrinus, Public Health Reports (Supt. of Documents, Washington, D. C. 5 cents a copy), 58(41), Oct. 8, 1943, pp. 1507-1509.

Author's conclusion: "Contrary to the general belief that R. r. alexandrinus inhabits only upper parts of buildings, the observations presented show that this species sometimes burrows in the ground and may be encountered under buildings and in basements and sewers. Most descriptions overemphasize the differences in harboring habits of the common species of rats." Bibliography of 16 titles.

Life Histories: Skunk, Spotted

Crabb, Wilfred D. Ecology and management of the prairie spotted skunk, Spilogale interrupta (Rafinesque), in southeastern Iowa, Iowa State College Journ. Sci. (Collegiate Press, Ames. $1.00 a copy), 18(1), Oct. 1943, pp. 22-24.

Abstract of a doctoral thesis. The study area and methods are briefly described. Dens were communal not individual property. Territoriality was not manifested. "The population density was determined at thirteen skunks per square mile with a sex ratio of 1.68:1." Travel was more restricted in winter than at other seasons; in wet or very cold weather, the animals did not leave their dens. Trapping for fur, predation by dogs, and control measures were the greatest causes of mortality. The development of a litter of young in captivity is recounted. Weights averaged 1 lb. 9-1/2 ozs. for males and 1 lb. 1 oz. for females. "Encouragement and discouragement types of management were practiced on the research area by farmers. Spotted skunks were encouraged for their possible controlling effect upon rodent population and discouraged for predation on poultry or for making dens in houses, wells, and among stored feed where their presence was not conducive to human well-being. Wise management of spotted skunks is co-ordinated with many good farming practices. In general spotted skunks deserve encouragement about Iowa farms."

Life Histories: Sparrow, Song

Nice, Margaret M. Studies in the life history of the song sparrow II. The behavior of the song sparrow and other passerines. Linn. Soc. N. Y. Trans. (Linnaean Society of New York, c/o American Museum of Natural History, New York, N. Y. $2.75 a copy, $2.00 if ordered directly from the Society), viii+328 pp., 1 pl., 6 figs., 26 tables, 1943.

While entered in the same category as Part I (WILDLIFE REVIEW, No. 11, Feb. 1938, pp. 21-22), this work "is primarily a treatise on the behavior of passerine birds with the song sparrow as the chief example." The author's convenient statement of the contents of the work may well be quoted. [Chapter I is devoted to a general discussion of the study of bird behavior, the students of most importance in connection with investigation, and the terms employed.] "Chapter II gives a detailed account of the first 4 weeks of a Song Sparrow's life, divided into 5 stages. Chapter III discusses the many activities of young passerines, arranged in 6 categories. Chapter IV is concerned with innate and learned behavior in the young bird and Chapter V with the course of development in passerines in general. Chapter VI concludes the section on the young bird with an account of behavior in the fall. In Chapter VII fundamental questions of social need and dominance are treated; this is of basic importance for much of the subsequent matter. Chapter VIII on awakening and roosting leads naturally to the 3 chapters on song--adult male and female, and inheritance, development and function. Territory is considered in Chapters XII and XIII, the first largely devoted to the Song Sparrow, the second to more general problems. Three chapters take up questions of mating and relations to neighbors, Chapters XIV and XV concerned mostly with Song Sparrows, Chapter XVI with problems of pair formation in general. Chapters XVII through XX on the nest, eggs, care and defense of the young, deal both with Song Sparrows and other species. Chapter XXI is on enemy recognition and XXII on innate and learned behavior in the adult. Although it was tempting to point out analogies with human behavior in many places, I refrained from doing so until the final chapter. The appendices contain detailed accounts of vocalizations, dominance, pair formation, etc., in the Song Sparrows. The gist of each chapter is given in its summary."

This publication undoubtedly greatly advances knowledge of its subject and absorbing it will be a necessity to students thereof. Bibliography of 29 pages; detailed index.

Life Histories: Waterfowl brood counts

Cartwright, B. W. Waterfowl brood counts in Manitoba, Saskatchewan, and Alberta, 1935, 1938-42, Journ. Wildlife Management (P. F. English, 206 Forestry Bldg., State College, Pa. $1.00 a copy), 8(1), Jan. 1944, pp. 79-80, 1 table.

Statistics from brood counts of about 8 groups each of tipping and diving ducks made during the last week of July in 6 years, 1935, and 1938 to 1942, inclusive. The average numbers per brood per year ranged from 5.61 to 6.18.

Life Histories: Widgeon, European

Hasbrouck, Edwin M. Apparent status of the European widgeon in North America, Auk (J. Fletcher Street, 1130 Locust St., Philadelphia, Pa. $1.00 a copy), 61(1), 1944, pp. 93-104, 2 maps, tables.

Summarizing 596 records, the author shows that the fall and spring movements are through essentially different territories, indicating definite migration paths. The author concludes: "The species is found not only singly or in pairs, but also in small flocks by itself or often in company with its near relative, M. americana. The southerly fall and northerly spring migrations strongly suggest a fixed American stock breeding somewhere in Arctic America, the locality yet to be discovered."

Management: Attracting wildlife

Dorer, Richard J. How to attract wildlife, Conservation Volunteer (Minnesota Dept. of Conservation, State Office Bldg., St. Paul, Minn.), 7(38), Jan.-Feb. 1944, pp. 14-18.

Adverse influence of clean farming on wildlife, to offset which suggestions are given as to windbreaks, shelterbelts, living snow fences, and hedges and the vegetational treatment of gullies, slopes, knolls, and stone walls. Water supplies and feed patches also are discussed.

Management: Bobwhite

Goode, R. J. Down-to-earth quail management, Alabama Conservation (Alabama Dept. of Conservation, Montgomery. 5 cents a copy), 15(4), Oct. 1943, pp. 13, 17.

Quail production is dependent chiefly upon the availability of adequate food and good cover. Suggestions are made of plants that may be used and how they may be managed. Protection from overshooting is vital; the annual take should not exceed 50 percent. Predator control also is discussed.

Management: Fur animals

Allan, Philip F. Fur bearers fight axis, Soil Conservation (Supt. of Documents, Washington, D. C. 10 cents a copy), 9(5), Nov. 1943, pp. 106-107, 117, 3 photos.

Value for fur, fat, and food indicated by facts and figures. Suggestions as to what can be done on farms to bring about increased yields.

Management: Overpopulations

Latham, Roger M. Our deer--past, present and future, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 14(9), Dec. 1943, pp. 4-5, 26-27, 6 photos.

Review of the history of the Pennsylvania deer herd, the effects of the abundance of which are detrimental to forestry and agriculture and to small game of the forests, as well as to the animals themselves. Control, though at first opposed, is now more generally approved by the public, and must be continued until the deleterious effects of the overpopulation are definitely checked.

Management: Overpopulations

Olsen, Orange O. Big game in multiple land use in Utah, Journ. Forestry (Mills Bldg., Washington, D. C. 50 cents a copy), 41(11), Nov. 1943, pp. 792-797, 1 table.

The author describes early game history and depletion which was followed by restoration so successful as to result in overpopulations that required control on account of their depredations. Regulated hunting has been resorted to; the number of hunters and of their kill in relation to the estimated populations of deer and elk are tabulated by mostly 5-year intervals for the period 1920-1942. "Cooperation between Federal and state officials, landowners, livestock permittees, and sportsmen is gradually resulting in the preparation of management plans for specific areas that will assure the sustained yield of big-game animals, along with other products, as part of an integrated program of land use."

The following article, "Recreation in relation to multiple land use in the west" (pp. 798-802), by J. V. K. Wagar, includes brief mention of wildlife.

Management: Planting for wildlife, partridge pea

Pearson, Allen M. Useful partridge peas, Alabama Conservation (Alabama Dept. of Conservation, Montgomery. 5 cents a copy), 15(3), Sept. 1943, pp. 8-9, 12, 14, 10 photographs.

The large or showy partridge pea (Chamaecrista fasciculata) is susceptible of cultivation. On poor soils, without fertilizer, it "consistently produced more ground cover than any other plant tested." It is especially recommended for field borders. Old stands can be rejuvenated by light disking. The plant is a soil improver, has value for erosion control, and provides good bee pasture. "A seed yield of 700 pounds per acre can be produced but 400 pounds x x x is considered average." Directions for harvesting and caring for the seed as well as for planting, and use in rotations are given. Partridge pea furnishes "food and cover for bobwhites and other desirable wildlife."

Management: Ponds

Anon. Multiple purpose farm ponds, Missouri Conservation Commission (Jefferson City), Bul. 15, 16 pp., illus., Sept. 1943.

The directions for planting around the pond include suggestions of plants valuable in providing cover and food for terrestrial wildlife. The bulletin seems clear and practical throughout.

Management: Refuges

Cronemiller, F. P. Deer refuges under the buck law, California Fish and Game (Ferry Building, San Francisco, Calif.), 29(4), Oct. 1943, pp. 180-190, Figs., 61-66, 1 table.

More than 2,500,000 acres in California are closed to hunting by established big-game refuges and 1,700,000 acres by national parks and monuments. The author, who had much to do with selection of the areas for State refuges, has re-examined the refuge question in the light of the advantages that were expected from making the reservations. He found that areas of heavy kill are not necessarily near refuges but are those of abundant forage wherever located. Deer have definite home ranges and do not disperse from the refuges as expected. Other aspects of the refuges are discussed and the author concludes: "(1) That deer refuges under the California buck law are of value where visual recreation is of greater importance than hunting; (2) that they are of value in areas of concentrated human use requiring the removal of the hazard of stray bullets; (3) that they are of value to furnish needed protection on well-defined migration routes, and in such localities to promote better sport; (4) that they are of value to furnish needed protection to deer on certain burned-over areas where escape cover is removed and concentrations are heavier because of a temporary increase in the amount of succulent feed; (5) that the establishment of a refuge as a means of reducing human use of an area, such as for the purpose of protecting a watershed from fire, is not meeting an issue squarely. Obviously the answer in this case is to establish an open season when human use will not be a threat to the major values and at a time when the animals are in a satisfactory condition for taking; (6) that under a buck law, refuges temporary in character may be of value in special problem areas, to prevent a heavy take of bucks and particularly to maintain the sporting values of trophy hunting; (7) that the use of a refuge as a game-management tool presupposes improper management of the areas open to shooting--this to the extent that hunting reduces the herds excessively or interferes with the breeding potential; (8) that refuges have not increased hunting opportunities but have resulted in a reduction in the take approximately equivalent to their proportionate area; (9) that retention by the Legislature of authority to establish, adjust, and abolish refuges precludes effective management and lends permanency to errors inherent in a system of fixed refuges and to the problems that develop within them; (10) that deer refuges under the buck law should be re-examined in the light of present-day knowledge and given a general overhaul."

Management: Stocking, Hungarian partridge

Dale, Fred H. History and status of the Hungarian partridge in Michigan, Journ. Wildlife Management (F. F. English, 206 Forestry Bldg., State College, Pa. $1.00 a copy), 7(4), Oct. 1943, pp. 368-377, 3 figs.

Author's summary: "Releases of Hungarian partridges in Michigan over the past 30 years have provided opportunity to observe the degree of success of these birds under various conditions. No release has had outstanding success, and nearly all have failed. Partridges are present over a considerable area in southern Michigan along the Ohio and Indiana borders, but are nowhere

abundant. Hillsdale County has the largest population at present, and parts of Lenawee and Monroe counties have fair densities. The climate of Michigan in summer does not seem favorable for partridges. Normal summer rainfall is higher than in successful habitat elsewhere, and maximum summer temperatures may approach the limit of tolerance for the species. Areas of light-textured soil or uneven surface seem to be most favorable, where drainage tends to counteract the effect of high summer rainfall, and ultimate success appears most likely on these areas." Bibliography of 16 titles.

Management: Stocking, pheasant

Lehmann, Valgene W. Pheasants in south Texas, Texas Game and Fish (Texas Game, Fish, and Oyster Commission, Austin), 1(10), Sept. 1943, pp. 5, 18, 1 photo.

Record of plantings from 1919; most of them failed. "In every instance where birds have been liberated in brush country they have disappeared almost immediately." Plantings in different types of country have resulted in temporary establishment of the birds, and one in Colorado County is thought to give promise of permanent results; young were reared in the wild each year from 1939 to 1942.

Management: Stocking, turkey

Ligon, J. Stokley. Mountain turkeys in Wyoming, Wyoming Wildlife (State Fish and Game Dept., Cheyenne), 8(10), Oct. 1943, pp. 1, 14-16.

Success in the introduction to the Laramie Peak area in Central Wyoming of the turkeys of the subspecies Meleagris gallopavo merriami from New Mexico. As most of the normal winter foods of this bird are lacking in the Wyoming habitat, substitutes must have been available. Success of transplants in New Mexico and Arizona has varied directly with control of the turkey's natural enemies. Further stocking in the State should be made by trapping and moving some of the acclimated birds.

An accompanying article, "Wild turkeys on Laramie Peak" (pp. 1-6, 2 photos, 1 map), by Louis E. Coughlin, gives details as to the colonizing and spread of the turkeys. They increased from 15 in 1935 to 600 in 1942 and extended their range into 16 townships.

Management: Trapping and transplanting deer

Thomas, Gail M., and Warren J. Allred. Mass trapping of mule deer, Journ. Wildlife Management (P. F. English, 206 Forestry Bldg., State College, Pa. $1.00 a copy), 7(4), Oct. 1943, pp. 407-411, 1 pl., 2 figs.

Efforts to control overpopulations by hunting proving unsuccessful, trapping and transplanting was chosen as a remedy in preference to mass official slaughter. Development of a corral trap and the construction and use thereof are discussed. From 4 to 23 animals were trapped at a time. Individual crating was found unnecessary and the use of trucks in transporting the deer is described.

Management: Water supply

Glading, Ben. A self-filling quail watering device, California Fish and Game (Ferry Building, San Francisco, Calif.), 29(4), Oct. 1943, pp. 157-164, Figs. 46-55.

Descriptions, illustrations, and directions for making and operating tanks with 400- and 600-gallon reservoirs; also of a rain-collecting "apron" of sufficient size that the run-off of half of the minimum annual rainfall will fill the tank. It is recommended that the tank be built where it will be shaded at least part of the time and that a coyote-proof fence be placed around it. Overuse by bees was found to be a serious drawback, but it was found that they rejected, while the quail accepted, a saturated solution of hydrated lime. This aspect of the water supply development is considered in an article by Glading and David M. Selleck immediately following that abstracted: "A bee repellent for use in quail watering devices" (pp. 165-167, Fig. 56, 1 table).

Management: Woodcock

Mendall, Howard L., and Clarence M. Aldous. The ecology and management of the American woodcock, Maine Cooperative Wildlife Research Unit (Orono), 201 pp., 14 pls., 11 figs., 19 tables, 1943.

A comprehensive report on investigations undertaken to develop management measures that might warrant retention of the woodcock upon the game list. The study areas and the methods employed are described; local investigations in Maine were supplemented by questionaries covering the entire range of the bird. In search of a means of determining sex in this rather uniformly plumaged species, the authors found that length of bill was the most dependable criterion. It is longer in females. Individuals of that sex also average heavier but there is too much overlapping of weights for this characteristic to be very reliable. The woodcock has withdrawn from the extreme western edge of its maximum breeding range but still nests practically throughout the eastern United States. It winters in southeastern states, most abundantly in Louisiana. A valuable section of the publication is composed of summaries of the status of the woodcock in each of the Canadian Provinces and Usonian States in which it has been recorded in recent years. Migration and migrating routes are discussed. The flights appear to be leisurely and near the ground--so much so that mortality from flying against obstructions is a serious limiting factor. Courtship behavior, including the flight song of the male, is dealt with at length as it appears that successful management may center largely about the singing grounds. The authors conclude that for all practical purposes the woodcock is monogamous. Singing grounds, as a rule, have slight ground cover, are nearly flat, and are within 100 yards of the edge of the male's diurnal territory and of the nesting cover. Both the singing grounds and the nesting sites are seldom less than 200 yards apart. Clutches vary from 3-5, and average 3.94, eggs each. The period of incubation averages 21 days. Hatching success in 6 years averaged 61.8 percent, probably lower than normal as some of the losses were due to study operations. Major factors in nest destruction were predation and interference by man or dogs.

There is no authentic record of the rearing of a second brood in a season. At 25 days the young are practically full grown. Juvenile mortality is low.

Treatment of food is largely review of the literature but a report upon the contents of 20 Maine stomachs is included. Animal food constituted 94.15% (of which earthworms were 86.05%) of the food. Feeding habits are rather fully described. Cover preference is discussed; it is predominantly for alder at all seasons in Maine. Cover in other regions also is considered. Management depends upon knowledge of numbers and the best means of estimating those of woodcocks is from count of occupied singing grounds. Banding methods are described and the returns summarized. As to causes of mortality the authors say that, "The sportsman has long been the most important factor in limiting the numbers of woodcock." Illegal hunting, important at some times in the past, is regarded as not excessive at present. Aside from the hunting kill, accidents and at times fires and climatic severities are important checks; predation, except by the domestic cat, seems unimportant. Diseases and parasites, sex ratios, and population trends and densities also are treated. The section on management is summarized as follows: "It is believed that the woodcock may be legally hunted and still maintain its existence if the sportsmen cooperate and if they are willing to abide by certain necessary restrictions. A careful determination of the proper season, annually, should follow accurate census studies and checks of breeding success. Changes in protective regulations will depend upon yearly populations. The importance of locating census areas immediately in all important parts of the breeding range cannot be overestimated. It is recommended that a series of refuges under State or Federal sponsorship, with permanent or temporary boundaries (depending on whether or not cover improvement measures will be carried out), be established throughout the range of the woodcock with the emphasis placed in concentration areas and in localities where hunting pressure is heaviest. The improvement of woodcock habitat may be carried out by several methods: (1) The creation of artificial singing grounds in areas where a deficiency of natural clearings exists--such as large tracts of unbroken young woodland. (2) The creation of new covers and preservation of existing covers by thinning and selective cutting or by clear cutting and controlled burning. (3) The control of fire. Fire can be a useful tool in woodcock management, but when uncontrolled, may wipe out countless management efforts. Spring burning of agricultural land should be discouraged, and all possible protection be taken against forest fires." Four-page bibliography. A much needed and informative paper.

Natural History: Birds of Ontario

Baillie, J. L., Jr., and C. E. Hope. The summer birds of the northeast shore of Lake Superior, Ontario, Contrib. Royal Ontario Museum of Zoology (Toronto, Canada), 23, 27 pp., 1 map, 1943.

Annotated list of 118 species; bibliography of 18 titles.

Natural History: Birds of Utah

Behle, Wm. H. Birds of Pine Valley mountain region, southwestern Utah, University of Utah (Salt Lake City), Bul. 34(2), Aug. 1943, 85 pp., 6 pls., 1 map.

Description of the region, of its habitats, and avifaunal associations; check-list of the birds of Washington County; annotated catalogue of birds observed by the writer; 4-1/2-page bibliography.

Natural History: Fur animals, Illinois

Brown, Louis G., and Lee E. Yeager. Survey of the Illinois fur resource, Illinois Natural History Survey Division (Urbana), Bul. 22(6), Sept. 1943, pp. 433-504, frontis. + 33 figs., 22 tables.

Brief sketch of trapping, fur animal decrease, and later protection in the State. "Despite all decimating factors x x x and despite the almost total lack of management, the Illinois fur resource returns an annual income of over $1,000,000 to the people of the state." The survey was conducted through personal interviews that were so distributed as to sample fairly the geographical and ecological provinces of the State. These are described and mapped. The work involving 1.7 percent of the total area of the State was carried on through 13 months, covering two trapping seasons. The number of fur-takers, including both trappers and hunters, was calculated to be in excess of 27,000 both years. "For the state, as a whole, density was about one fur-taker per 2 square miles." A summary of the calculated fur animal catch, value, trapping and hunting success, population fluctuation, and popularity, 1938-39 and 1939-40, is given in tabular form relating to 8 species. Numerically the muskrat led, followed by the opossum; in total returns the muskrat was first and the mink second. Species other than the 8 most common also are treated and there is an account of each, summarizing information obtained regarding it along the lines under which the inquiry was conducted. House cat numbers were estimated at 1,500,000. "This species, perhaps the most common predator in the state, was of practically no value in the fur trade." For predator control, hunting and trapping in season are recommended over other measures. Habitats for Illinois fur animals appear to be deteriorating. Grading of furs and factors affecting it are discussed. Bibliography of 40 titles.

Natural History: Mammal tracks

Mason, George F. Animal tracks (Wm. Morrow & Co., 386 Fourth Ave., New York, N. Y. $1.50 a copy), 95 pp., fully illus. 1943.

If the title is taken literally, the serious reader may be disappointed. The text gives only scanty attention to the tracks of mammals and tracks made at more than one gait are illustrated for only a few of the species. However, the book contains good thumb-nail biographies, and is in a field which has been poorly covered by publications. Each species is illustrated by a pencil drawing of the animal. Most of these sketches are acceptable but a few, those of the red fox, coyote, and kangaroo rat, for examples, could well have been improved.--Victor H. Cahalane.

Natural History: Mammals of Idaho

Orr, Robert T. Mammals of the Clearwater Mountains, Idaho, Proc. California Academy of Sciences (Golden Gate Park, San Francisco, Calif.), Ser. 4, Vol. 23, No. 35, pp. 511-536, Pls. 45-47.

Ecology of the area; annotated list of 40 species; bibliography of 15 titles.

Natural History: Mammals of Louisiana

Lowery, George H., Jr. Check-list of the mammals of Louisiana and adjacent waters, Louisiana State University (Baton Rouge), Occasional Papers of the Museum of Zoology, 13, pp. 213-257, 3 pls., 1 map, 4 tables.

Rather than a check-list, this is a fully annotated catalog of the mammals of Louisiana, including 79 species and subspecies. Three of the latter, a shrew, a bat, and a raccoon, are described as new. The introduced coypu is apparently well established. This author is doing outstanding work in modernizing the natural history of vertebrates in the South.

Natural History: Mammals of Mississippi

Cook, Fannye A. Game animals of Mississippi, Mississippi State Game and Fish Commission (Jackson) Pittman-Robertson Project, Miss.3-R, 42 pp., tables (mimeographed), 1943.

The introduction treats wildlife exploitation by the aboriginal and immigrant inhabitants of the State and outlines present efforts at protection and the principles of mammal classification. The accounts by species discuss occurrence, utilization, and conservation in the State and give in varying detail and under differing headings, information on classification, haunts, habits, and other features of the life history of bears, deer, foxes, opossum, squirrels, and rabbits. For some groups, there are a good many measurements of skins and skulls.

Natural History: Mammals of South Dakota

Over, Wm. H., and Edward P. Churchill. Mammals of South Dakota, University of South Dakota Museum of Zoology (Vermillion), 59 pp., 1 map. (processed), 1941.

Annotated list of 110 species and subspecies, a few of which have been extirpated. Comment is longest for the species of historical and economic interest. The publication contains many notes on food habits.

Natural History: Reptiles of Minnesota

Breckenridge, W. J. Reptiles of Minnesota, Minnesota Dept. of Conservation (State Office Bldg., St. Paul 1), Conservation Bul. 3, 24 pp., illus., 1943.

Essays brought together from The Conservation Volunteer on: Snake myths vs. facts; characteristics, occurrence, and habits of the non-poisonous snakes, rattlesnakes, turtles, and lizards of Minnesota. There is an illustrated key to 8 species of turtles. All figures by the author.

Natural History: Speed of flight

Broun, Maurice, and Ben V. Goodwin. Flight-speeds of hawks and crows, Auk (J. Fletcher Street, 1120 Locust St., Philadelphia, Pa. $1.00 a copy), 60(4), Oct. 1943, pp. 487-492, 2 tables.

Results of timing at Hawk Mountain, N. J., for 14 species of raptors and the common crow.

Natural History: Waterfowl of Minnesota

Swanson, Gustav. Minnesota Waterfowl, Minnesota Dept. of Conservation (State Office Bldg., St. Paul 1), Conservation Bul. 1, 32 pp., illus., 1943.

Sketches assembled from The Conservation Volunteer giving information on species and their ranges, feeding and nesting habits, limiting factors, conservation and restoration, and study of the waterfowl of Minnesota. The illustrations are by J. J. Breckenridge.

Predation

Poole, Earl L. Predators on a game refuge, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 14(10), Jan. 1944, pp. 10-13, 6 drawings by the author.

Interesting summary of 15 years of observation on an auxiliary game refuge in Pennsylvania. "In that time," the author says, "I have seen much that leaves me to believe predation is a much less serious factor in the abundance or wildlife on such an area than some would lead us to think, and that whatever changes in population have occurred have been due more to radical changes in environment, caused by the increasing crowding of pines, the draining of marsh areas, and the alternate raising and lowering of the level of the artificial Lake Ontelaunee which forms the center of the area. It is evidently these factors that have resulted in the disappearance of such species as the Bobwhite, the rails and the Blue-winged Teal as breeders, while other species more adaptable in their habits, have long been maintained at the saturation point; as evidenced by the fact that in the past six years some 13,000 rabbits and 1,500 pheasants have been removed from the refuge for stocking elsewhere, and a certain amount of supervised trapping of furbearers has been permitted in parts of the tract. Today I would venture to say that there is much more wildlife on the area than there was at the time of the establishment of the refuge, and much of the excess has spread into contiguous areas, in spite of the fact that the so-called predators are also probably just as numerous as ever." "Altogether if I were to sum up my impression, arrived at with an open mind, I would say that in this tract, over the 15 years mentioned, nature has apparently struck an optimum balance. Efforts at 'control' of any sort have been at a minimum and even then, often misdirected; yet a goodly overflow crop of game comes from the tract each year, a closely regulated amount of trapping is permitted; and the predators, so far as I have been able to see, have made no appreciable inroads on the other population."

Predation: Osprey

Lambert, Gordon. Predation efficiency of the osprey, Canadian Field-Naturalist (I. L. Conners, Central Experimental Farm, Ottawa, Canada. 25 cents a copy), 57(4-5), April-May, 1943, pp. 87-88.

High: 95.68, low: 80.39; average 89.34 based on 469 strikes.

Propagation: Feeding: pheasant chicks

Stadelman, W. J., R. R. Murphy, E. W. Callenbach, and R. V. Boucher. Satisfactory war-time rations for pheasant chicks, Journ. Wildlife Management (P. F. English, 206 Forestry Bldg., State College, Pa. $1.00 a copy), 8(1), Jan. 1944, pp. 56-60, 6 tables.

War-time conditions have restricted the supplies of dried milk products, meat scraps, and fish meals. Necessity of protein diet and previous findings as to its proper level are discussed. The author experimented with diets containing substitutes for the proteins formerly used. Compositions and chemical analyses of 8 trial diets and the results of feeding them are tabulated and discussed. "The results indicate that in pheasant starting rations soybean oil meal can replace large proportions of the usual animal protein supplements and that dried whey or a combination of dried whey and brewers' dried yeast can replace dry skim milk." Bibliography of 11 titles.

Propagation: Partridge, Chukar

Hooke, Claude. The chukor partridge, Modern Game Breeding (Doylestown, Pa. 25 cents a copy), 13(11), Nov. 1943, pp. 4-5, 2 photos.

Presents notes on three subspecies as to appearance, native range, and type of country to which suited. Advises their being bred and stocked separately. In the form of answers to 15 questions, gives information on incubating, feeding, penning, and other care.

Propagation: Quail pens

Nestler, Ralph B. New types of pens for bobwhite quail, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 14(9), Dec. 1943, pp. 14, 31, 1 chart, 1 fig., 2 photos.

Description, bill of materials, plan, and illustrations of a holding pen, and briefer treatment of a breeding pen, which have proved satisfactory through three years of use.

Propagation: Salt in quail diets

Nestler, Ralph B. Effect of large quantities of common salt in the diet of bobwhite quail, Journ. Wildlife Management (P. F. English, 206 Forestry Bldg., State College, Pa. $1.00 a copy), 7(4), Oct. 1943, pp. 418-419, tables.

The diets used are tabulated; they included salt in percentages ranging from 2 to 8. Adults appeared not to be harmed by 2 to 6 percent mixtures of salt. Young birds were killed by various additions of salt but some survived the highest dosage. In a test of salt effect upon reproduction (2 lots of birds receiving sodium chloride mixtures of 0.5 and 2.0 percent, respectively), differences in egg production and in fertility were not significant but hatchability was definitely affected. For the low level group, it was 42.4 percent and for the high level lot, 61.3 percent. Both of these proportions are low compared to the normal.

Research: Age determination

Petrides, George A., and Ralph B. Nestler. Age determination in juvenal bobwhite quail, American Midland Naturalist (Notre Dame, Ind. $1.00 a copy), 30(3), Nov. 1943, pp. 774-782, 1 fig., 3 tables.

Individual variation is great enough to limit the accuracy of age determination after the 10th week. "The post-juvenal wing molt began on the birds' 28th day and ended when the quail were 146 and 154 days old. The post-juvenal body molt was found to take place largely between the 70th and 100th days. The juvenal rectrices were renewed from the 62nd to the 122nd days, the new feathers being as long as their longest coverts when the birds were 116 days old. The color of the tarsi varied from pink, at 32 days of age, to straw color at 60 days, and yellow-gray from 83 to 100 days. At six months, the color of the beak was identical with that of adults. Unlike several other game bird species, the flexibility of the lower jaw was not an accurate index to age in bobwhites older than 11 weeks." Bibliography of 8 titles.

Research: Age and sex determination

Keiser, Leon P., and Edward L. Kozicky. Sex and age determination of wild turkeys, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 14(8), Nov. 1943, pp. 10-11, 26, 4 photos.

Discussion and appraisal of the value of various characters in distinguishing the sex and age of these birds, including weight, beard, caruncula-tion, plumage, toe length, and bursa of Fabricius. Bibliography of 6 titles.

Research: Bird watching

Hickey, Joseph J. A guide to bird watching, Oxford University Press (114 Fifth Ave., New York, N. Y. $3.50 a copy), xiv+262 pp., illus., 1943.

The author has not forgotten his learning days and writes sympathetically and sensibly of the problems and pitfalls of the beginner. Methods and equipment are discussed and interesting chapters contributed on migration study, bird counting, bird distribution, bird banding, and the art of bird watching. Appendices treat the tracks of shore birds (on the basis of studies by the late Charles A. Urner); some results of breeding bird censuses; outline for a life-history study; bird books (a useful classified and annotated bibliography); and bird clubs in the United States and Canada (state and provincial lists).

Among topics, live in wildlife management discussions, the reader will find something of interest on: census methods, cover, cycles, edge effect, habitat, territory, and others. A well-planned, attractively written, and useful book.

Research: Food preferences of bobwhite

Nestler, Ralph B. Germinated seed versus ungerminated seed in the diet of adult bobwhite quail, Poultry Sci. (Poultry Science Association, Menasha, Misc. 75 cents a copy), 22(3), May 1943, pp. 227-229, 4 tables.

Author's summary: "Two tests were conducted to determine whether adult captivity-reared Bobwhite quail prefer germinated seed to ungerminated seed. In the first test acorns (Quercus nigra), wild beans (Strophostyles helvola), yellow corn (Zea mays), and black locust seeds (Robinia pseudoacacia) were studied in the fresh stage, whereas in the second test, bush clover seed (Lespedeza stipulacea) was studied after the germinated seed had been dried at 100° F. Except in the case of the wild beans, no preference was shown the germinated seed over the ungerminated seed. In fact, there was a tendency, especially in the case of the dried lespedeza, for the ungerminated seed to be preferred. A decided preference was shown for germinated wild beans over the ungerminated seed. Over a period of six weeks, during winter outdoors in holding pens, adult quail maintained their weight as satisfactorily on a diet containing 50 percent ungerminated lespedeza as on one containing 50 percent germinated lespedeza."

Research: Live-trap

Morris, R. F. A new live-trap for small mammals, Canadian Field-Naturalist (I. L. Conners, Central Experimental Farm, Ottawa, Canada. 25 cents a copy), 57(6), Sept. 1943, pp. 113-114, 1 pl.

Description and illustrations of a chiefly wooden trap.

Research: Marking pheasants

Wendell, Willet H. A multi-marking system for ring-necked pheasants, Journ. Wildlife Management (P. F. English, 206 Forestry Bldg., State College, Pa. $1.00 a copy), 7(4), Oct. 1943, pp. 378-382, 2 pls., 3 figs.

Author's summary: "(1) A marking system was developed for application to artificially propagated pheasants prior to liberation to assist in the identification of kills in the field, and was used with decided success in 1940, 1941 and 1942; (2) in developing various techniques the points of primary importance were: (a) completeness, the more parts of each bird marked the greater possibility of identification from remains; (b) permanency, each marking, to be satisfactory, must be identifiable for at least several months; (c) simplicity and ease of application, each technic must be capable of easy and rapid application with untrained assistance; and (d) harmless after effects, markings must not affect the vitality of the bird or make it more attractive to predators; (3) the techniques developed included: notching bills, notching toe

claws, marking leg scales, tattooing wing webs, and lacquering feathers; (4) following the 1941 spring release 39 casualties of 'wild' and liberated birds were reclaimed in two months, indicating a total effectiveness of 87 per cent for this system."

Research: Trapping and tagging muskrats

Takos, Michael J. Trapping and banding muskrats, Journ. Wildlife Management (P. F. English, 206 Forestry Bldg., State College, Pa. $1.00 a copy), 7(4), Oct. 1943, pp. 400-407, 1 pl., 1 fig., 1 table.

Two kinds of traps were used, both of which are described and one figured. Method of handling a muskrat loosely enveloped in a burlap bag is described. Different styles of tagging were tried; a ring about the Achilles tendon proved best. One hundred and ten animals were handled a total of 265 times. When the methods were perfected, mortality was low. Bibliography of 6 titles.

Research: Trapping and tagging woodchucks

Trump, Richard F., and George C. Hendrickson. Methods for trapping and tagging woodchucks, Journ. Wildlife Management (P. F. English, 206 Forestry Bldg., State College, Pa. $1.00 a copy), 7(4), Oct. 1943, pp. 420-421, 1 fig.

Description and illustration of a successful trap; method of applying ear-tags.

Weights: Jackrabbit

Mohr, Carl O. Weight and length of white-tailed jackrabbits in Blue Earth County, Minnesota, Journ. Mammalogy (Emmet T. Hooper, University of Michigan, Ann Arbor. $1.00 a copy), 24(4), Nov. 1943, pp. 504-506, 1 table.

Commendably reported in inches and pounds, which despite efforts in behalf of the metric system, are the only units that really mean anything to those educated to the English methods. Weights varied from 6.5 to 9 lbs. Formerly rare, the jackrabbit has become numerous in this area as a sequel to clearing and drainage operations.

Weights: Raccoon

Nagel, Werner O. How big is a 'coon?, Missouri Conservationist (Missouri Conservation Commission, Jefferson City), 4(7), Oct. 1943, pp. 6-7, 1 photo.

"The average weight of 5,371 males was 14.9 pounds and of 2,809 females, 13.1 pounds." Average weights were closely correlated with soil fertility.

WILDLIFE LEAFLETS

Issues of interest to wildlife managers additional to those previously mentioned are listed below. Copies of these mimeographed leaflets can be obtained from the Fish and Wildlife Service, U. S. Department of the Interior, Chicago, Ill.

238. Klamath Basin national wildlife refuges, by Stanley G. Jewett, 17 pp., cover cut, 1 map, May 1943.

History of the region; description of the Upper Klamath, Lower Khamath, Tule Lake, and Clear Lake refuges; life zones of the area and their characteristic plants, birds, and mammals; interesting features; lists of birds and mammals; directions for reaching the refuges.

250. The status of migratory game birds: 1942-43, 11 pp., December 1943.

Annual summary of findings as to conditions on the breeding and wintering grounds, status of the waterfowl in their migrations and at the time of the January inventory. Special discussions of the woodcock, Wilson's snipe, rails and coots, mourning and white-winged doves, and the band-tailed pigeon.

NOTES AND NEWS

Dr. Warren S. Bourn of the Fish and Wildlife Service has prepared a translation of Gunnar Lohmmar's "Water chemistry and higher vegetation of Swedish lakes" (208 ms. pp.), of which copies can be consulted at Service headquarters in Chicago. One assigned to the compiler of WILDLIFE REVIEW is available for loan.

Too late for insertion in WILDLIFE REVIEW, No. 38 came the information that copies of H. H. T. Jackson's paper on "Summer birds of northwestern Wisconsin," assembled from several issues of The Passenger Pigeon, may be obtained for 30 cents each from H. R. Burger, 4333 Hillcrest Drive, Madison, Wis.

The Bulletin of the National Speleological Society contains references to cave vertebrates. It is issued irregularly and available issues may be obtained from the Editor, Don Bloch, 5606 Sonoma Road, Bethesda 14, Md., at $1.00 a copy.

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